CUSTOM HANDSCREW CLAMPS
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omes and Gardens®

WOOD®

THE #1 MAGAZINE FOR HOME WOODWORKERS

JUNE 1990 • ISSUE NO. 35
Display until June 19

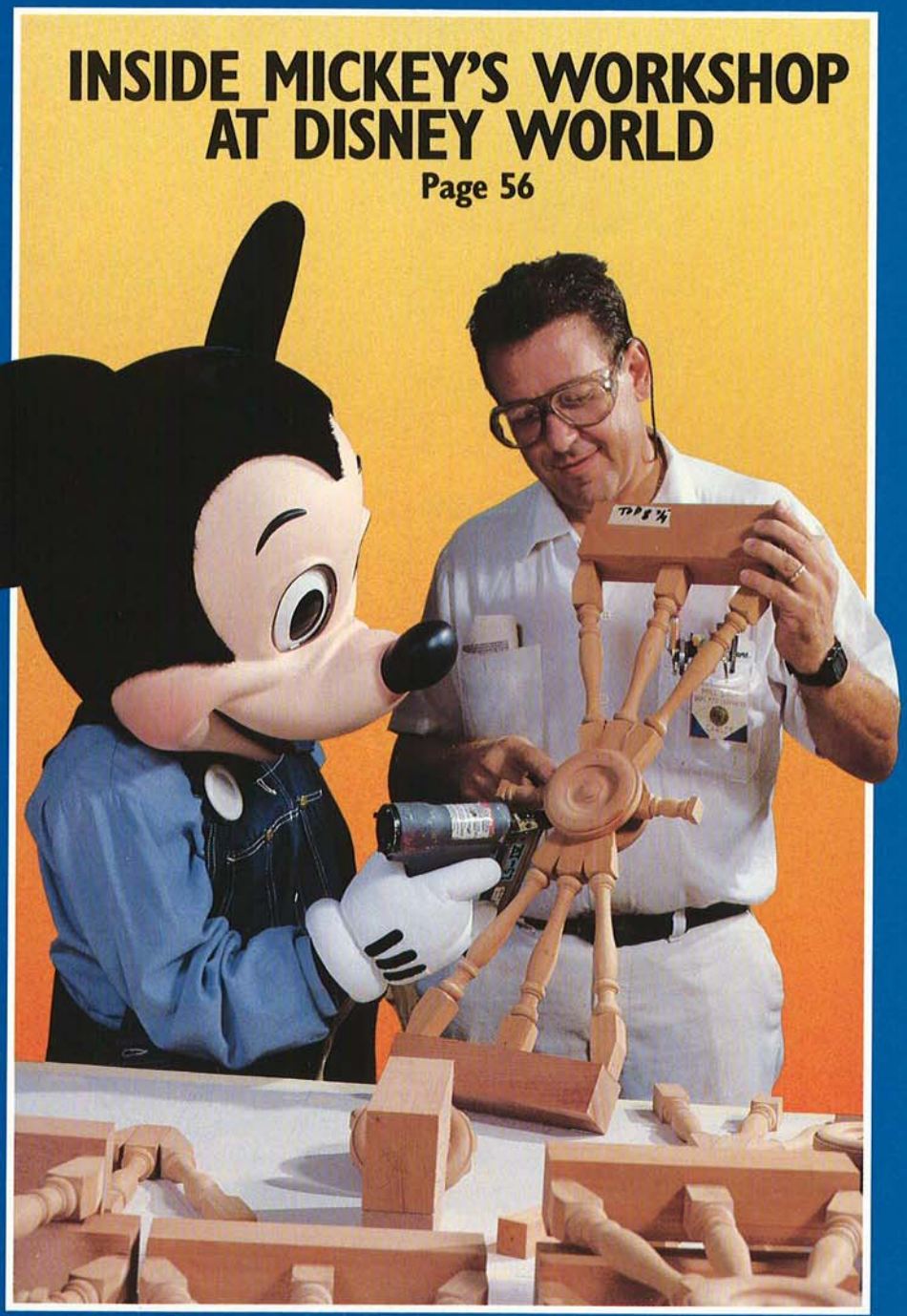
4 FUN-TO-MAKE TOY WHEELS
See page 40

SHOPSMITH vs. TOTAL SHOP
Feature-by-feature comparison of these look-alike machines

5 EASY STEPS TO A GLASS-SMOOTH TABLETOP FINISH

WINNERS ALL!
Victorian settee
Spoon/thimble wall cabinet
Monster truck

INSIDE MICKEY'S WORKSHOP AT DISNEY WORLD
Page 56



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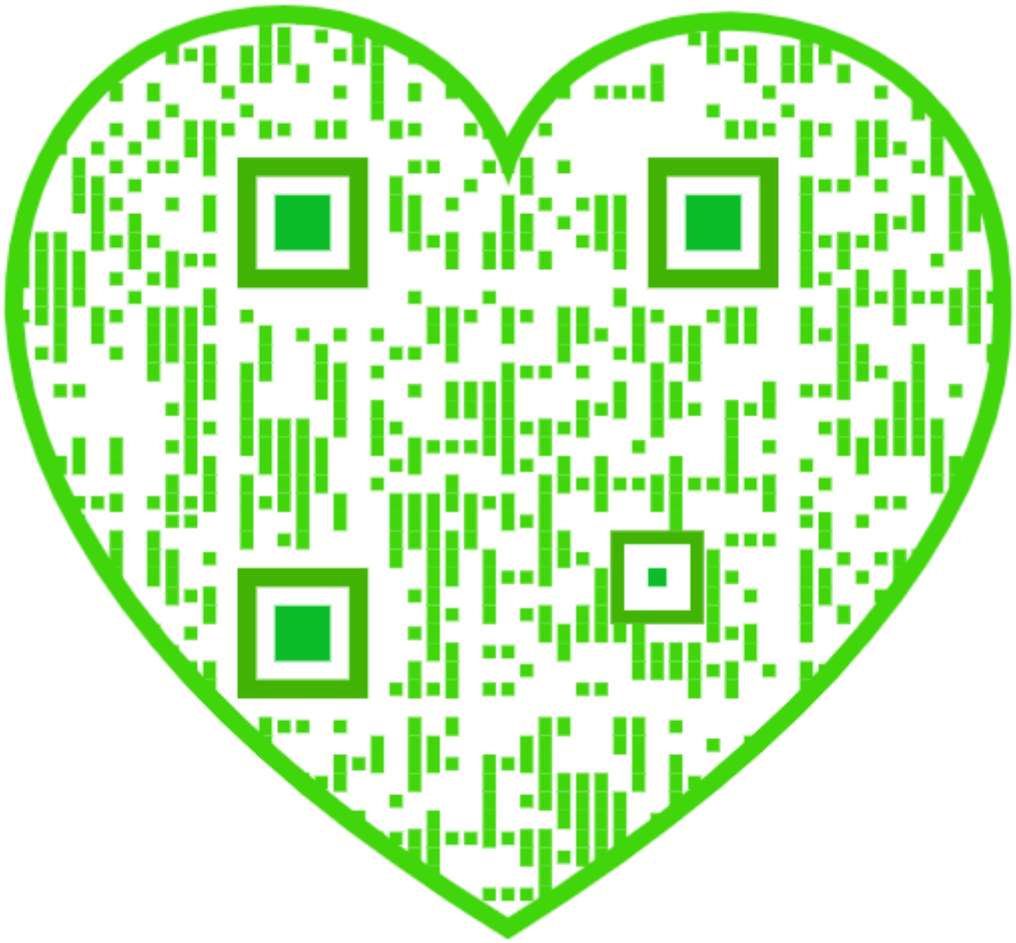

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#418		¾" Core Box	round nose	¾"	⅝"	¼"	$15.00
#719		1" Core Box	round nose	1"	¾"	½"	$18.00
#470		¼" **Straight**	plunge cutting	¼"	¾"	¼"	$ 7.00
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#472		⅜" Straight	plunge cutting	⅜"	1"	¼"	$ 7.00
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#775		½" Straight	plunge cutting	½"	2"	½"	$14.00
#476		9/16" Straight	plunge cutting	9/16"	1"	¼"	$ 7.00
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#479		¾" Straight	plunge cutting	¾"	1"	¼"	$10.00
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#503		½" Flush	Trimming	½"	1"	¼"	$ 8.50
#804		½" Flush	Trimming	½"	13/16"	½"	$ 9.00
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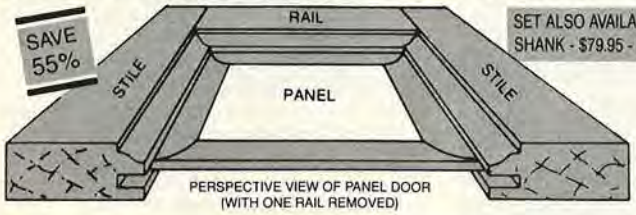

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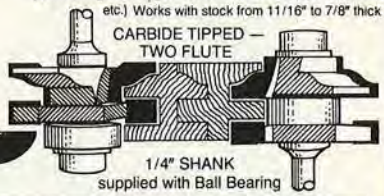

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June 1990 • Vol. 7, No. 3 • Issue No. 35

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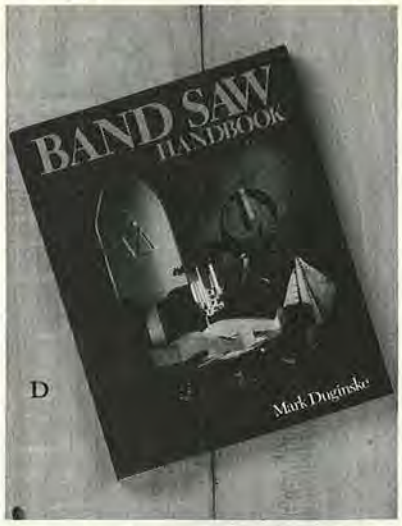

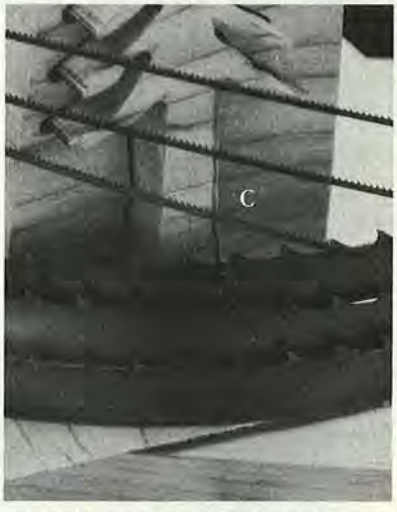

C / Garrett Wade Has Discovered Some Very Interesting Bandsaw Blades

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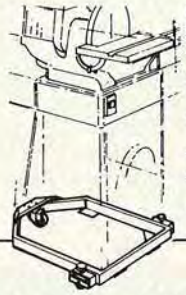

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This issue's cover wood grain: cottonwood

JUNE 1990 ISSUE NO. 35

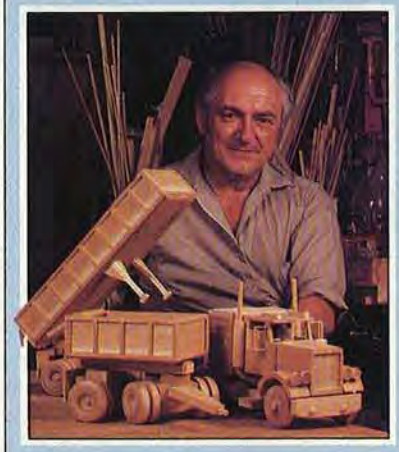
WOOD PROFILE
Black walnut—the native aristocrat 33
Long ago, Europeans crowned oak as their favorite hardwood. But in North America, walnut continues to hold royal status.

TOOL BUYMANSHIP
Shopsmith vs. Total Shop 35
Lathe-based multipurpose tools make a lot of sense for some woodworkers—and especially those working in cramped quarters. In this issue, our testing team examines the differences between two look-alike models.

SHOP-TESTED TECHNIQUES
4 Fun-to-make wheels 40
Everyone knows you can really dress up a full-sized car with a sharp wheel and rim. Now, put the same principles to work with your next toy project.

NOW YOU CAN BUILD IT
Fun-charged monster truck 46
Here's another great toy design from the 1989 Build-A-Toy™ competition—this pickup with huge wheels comes from a retired Oldsmobile engineer.

5 Easy steps to a finish that's glass-smooth 50
We found a couple of nifty 3M automotive products that easily adapt to woodworking. Best of all, the depth of the shine will amaze you.



CRAFTSMAN CLOSE-UP
Toys for the big boys 52
Meet Karol Fedoryshyn, a talented Manitoba woodworker who crafts realism into the 1/12-scale models he builds for Canadian truck drivers.

The wonderful woodworking world of Disney 56

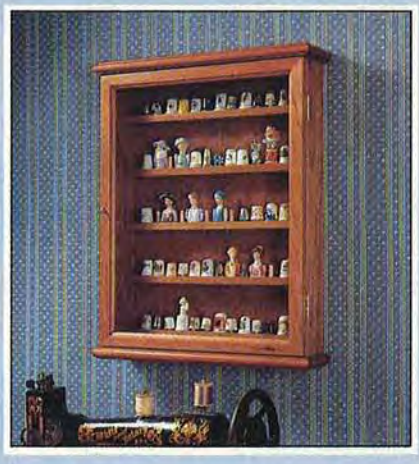
Fifty or so woodworkers in Orlando, Florida, have jobs most of us dream about: They work for the world's most famous mouse.

Solid-oak settee 60

Toss away the plastic lawn furniture—this outdoor project is comfortable enough for a whole day of reading and relaxing. Even better, the settee should last a lifetime, too.

Collector's showcase 68

You'll be pleased how smartly teaspoons, thimbles, and a long list of other small collectibles show off in this cherry wall-hung case.



WOODWORKER'S SURVIVAL GUIDE TO BUYING...

Mail-order products 72

Because so many readers buy wood, tools and supplies through catalog firms, it makes sense to review buying practices that avoid disaster.

COLLECTOR'S EDITION

Handscrew clamps 74

No, this isn't another one of those complicated handscrew projects that require incredibly involved drilling setups. We're confident you'll quickly master this laminated design.

SHORT-SUBJECT FEATURES

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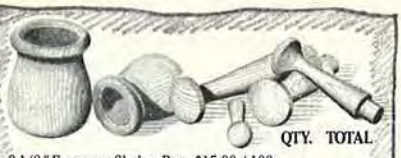

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THE EDITOR'S ANGLE

'LOOK WHAT SAILBOAT PAPA MADE FOR ERIN AND ME'

Photograph: Mercer Harris Photography

Best friends Elisa Riley, left, and Erin Martin show off their strollers made by "Sailboat Papa."

All of us here at *WOOD®* magazine love hearing from readers because your letters tell us a couple of important things. First, they let us know you appreciate all the hard work that goes into each and every issue of the magazine. And second, they allow us to hear about and sometimes even see what you have been up to.

That's why we were so happy when Georgia Cowan, from Naples, Florida, dropped us a line not long ago and shared with us a couple of photos showing some of her husband Ian's handiwork. Ian, who has been woodworking most of his life, has built everything from his own house to a 30-foot sailboat—complete with kitchen, a master bedroom, and a small bathroom. But I'm willing to bet that the strollers he built for his granddaughter, Elisa Riley, and one of Elisa's best friends, Erin Martin, won him more brownie points than any other project he's ever undertaken.

I talked to Elisa the other evening, and it's apparent to me that this 5-year-old is pretty darn impressed with "Sailboat Papa"—her name for Ian. And, with her stroller, a project that appeared in our December 1987 issue. She reports that she and Erin are having lots of fun "carting their dolls around the neighborhood."

Roscoe the Raccoon rough-out a rip-roaring success

A big "thank-you" to all of the carvers who ordered rough-outs of the Desiree Hajny raccoon carving that appeared in the June 1989 issue. And thanks to Ron Conn, the Branson, Missouri, carver who manufactured and sent out the rough-outs. As promised, we have sent more than $1,400 to the National Wildlife Federation's Backyard Wildlife Habitat Program to educate the public in how to attract birds and other wildlife to urban areas.

Print this article

Larry Clayton

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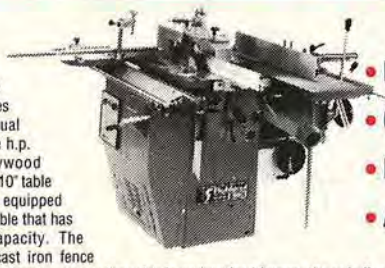

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TALKING BACK

We welcome comments, criticisms, suggestions, and even an occasional compliment. Send your correspondence to: Letters Editor, Better Homes and Gardens® *WOOD*® Magazine, P.O. Box 11454, Des Moines, IA 50336-1454.

In the states, we're catching on

I was somewhat amused with your article in the June 1989 issue concerning square-drive screws. My father introduced me to square-drive screws and drivers in the early 1960s when I was a young boy working on my own projects. And ever since, "Robertson," as we call them, has been the screw to use for me and my dad. I can assure your readers that once they try square-drive, they'll be hooked.

—Carl Ambridge, Hamilton, Ontario

Children inherit 'disease' from woodworker's spouse

Just received the last edition of *WOOD* magazine, which included my shop tip about making duplicate marks with BBs. Sure made my day! Thanks!

There is a problem in my workshop. Since you are partially the cause of it, I hope you will help a fellow woodworker get out of his dilemma. Each time your magazine arrives at our house, my wife comes down with a strange disease. I call it "I want this and thisitis" disease. I usually can cure her by making the projects she wants. The big problem is with our five children. They have inherited the same disease from their mother. What this means is that I do not have time to design myself.

—Bernard Paumier, Baltimore, Ohio

Bernard, our research indicates this affliction can spread to grandchildren, too. We suggest you take immediate measures to rope another family member into the workshop. Then, someone else can help you "doctor" the family.

A remedy for irritating bandsaw welds

In the December 1989 issue, I found the article on bandsaw blades to be informative. I would like to comment about inspecting the welds of new blades. I have encountered a slight half-moon depression in the back edge of the blade in line with the weld. The result: a thump when the depression goes over the back-blade guides. This irritation makes for rougher cuts and shortened blade life. I try not to buy defective blades. However, when I do, I file the back of the blade to make the entry and exit of the depression less severe.

—John Walter, Columbus, Indiana

Continued on page 9

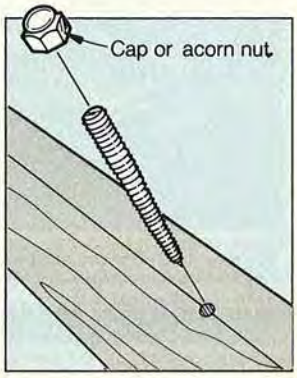
Print this article

TALKING BACK

Continued from page 8

That would be a cap or acorn nut

As a hobbyist and do-it-yourselfer in the home and craft area most of my life, I've become an avid reader of *WOOD* magazine. The detail and accuracy of your articles are excellent, but even the best, on occasion, have a slip.



Such is the case in your February 1989 issue in the shop tip "easy way to install hanger bolts." What you call a cap screw is quite obviously a cap nut or sometimes called an acorn nut.

One small caution: Cap nuts usually are found in brass. As such, if the pilot hole is not properly drilled for the hanger bolt, you can force the hanger bolt out through the crown of the cap nut. Here's another solution: Jam two conventional hex nuts against each other, and then tighten with a wrench.

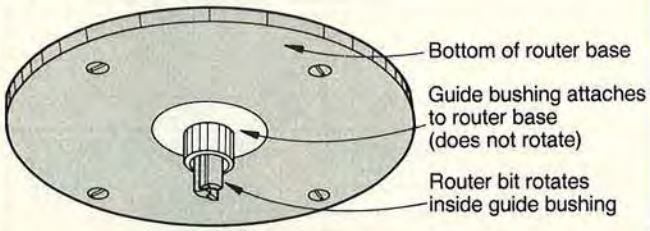
—Larry A. Stanley, president, Empire Bolt and Screw, Inc., Spokane, Wash.

Tell me more about guide busings

I found the article about router tricks in the February 1990 issue most interesting. Everything seems reasonably clear, except it would seem that the guide bushing for the router bit would have to be on the top of the cutter, and I can't seem to locate one. If I am missing something, I would appreciate an explanation of how to cut the circle after the template has been made.

—Don Dragon, Easton, Maryland

Don, some woodworkers confuse a router guide bushing, which attaches to the router base, with a pilot bearing, which is part of a router bit. Guide bushings cost about $7 apiece and mount to the router as shown below.



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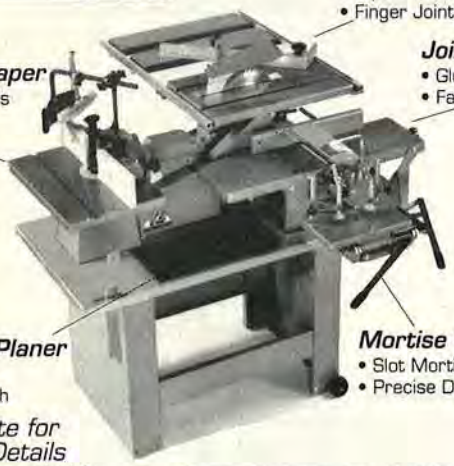

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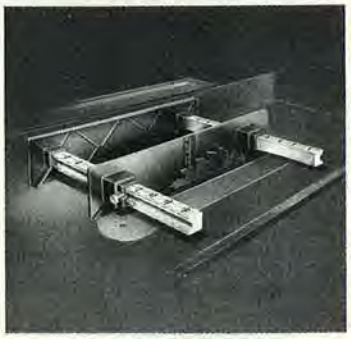

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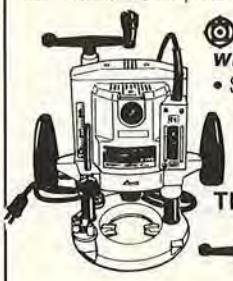

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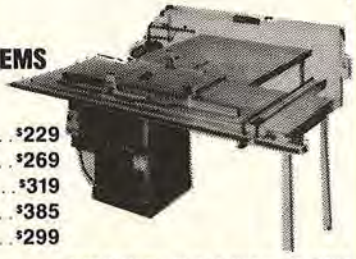

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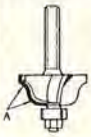

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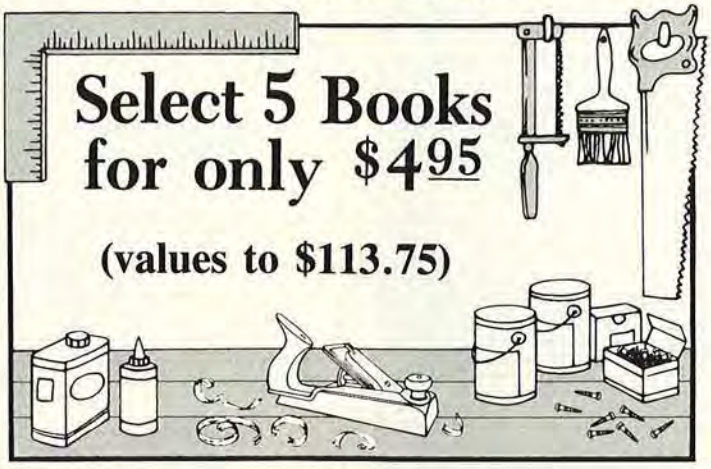

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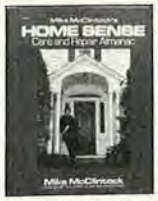

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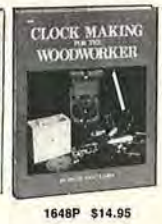

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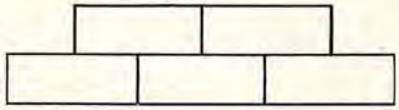

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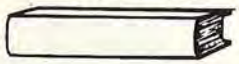

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PRODUCTS THAT PERFORM

Jig makes bandsawed dovetail joints a snap

Few things give a look of fine craftsmanship to a project the way that precision-cut through dovetails do. In the past, I've used backsaws to handcut such dovetails, but after testing the Jiggit bandsaw dovetail jig, I doubt that I'll ever go back to that method. The Jiggit helped me cut tight-fitting dovetails with a minimum of fuss or guesswork.

To use the jig, I placed the dovetail pin stock on one side of the roof-shaped jig, made a series of cuts for one side of the pins, then made a similar series of cuts on the other side of the jig's "roof." Doing it this way, you can cut the pins in an infinite number of sizes and spacings. After cutting the pins, you just clean them up with a chisel, trace them onto the mating piece of stock, and cut the necessary sockets with your bandsaw.

I did, however, find that I had to clamp a piece of hardboard to the "roof" to extend its support area when I made the final cuts. Because the plastic jig curves near its peak, I couldn't hold the pieces steady without the hardboard extension. So I'd like to see the jig's brief instructions include a mention of how to use such an extension, and illustrations of dovetail construction for the benefit of novice dovetailers. Gaylord Livingston of Jiggit told me he plans to expand the instructions.

—Tested by C. L. Gatzke

Jiggit bandsaw dovetail jig, $53.95 ppd. from Jiggit, Rd. 1, Box 35, Chazy, NY 12921.

Continued on page 14

Continued from page 13

Power steel wooling

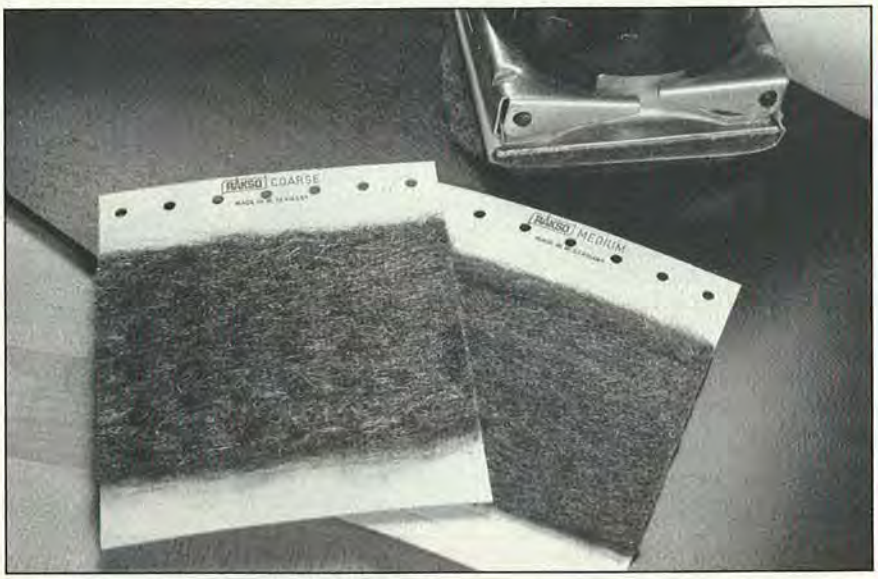
This product falls under the category of those that make me wonder, "Why hasn't someone thought of this before?" Rakso's steel wool sheets attach to your ¼- or ½-sheet sander, enabling you to steel-wool surfaces just as you would power-sand them.

The Rakso sheets helped me quickly smooth out coats of lacquer and enamel paint on large, flat surfaces. Since the product doesn't wear unevenly like steel wool pads, one sheet lasted a surprisingly long time. An added benefit: the sheets uniformly removed the finishes, leaving no swirl marks to telegraph through to the next coat.

I also had excellent results when power-scrubbing rust off stationary machine tables. It helped to apply a solvent/lubricant such as WD-40 to the table prior to scrubbing.

—Tested by Jim Boelling

Rakso steel wool sheets, $12.95 for six ¼ sheets (2 of each grade), $14.95 for six ½ sheets, from Woodworker's Supply of New Mexico, 5604 Alameda Place, NE, Albuquerque, NM 87113. Include $4.50 postage for orders under $15 or $5.50 for orders $15–$29.99, $6.75 for orders $30–$49.99 and $7.50 for orders $50–$300.



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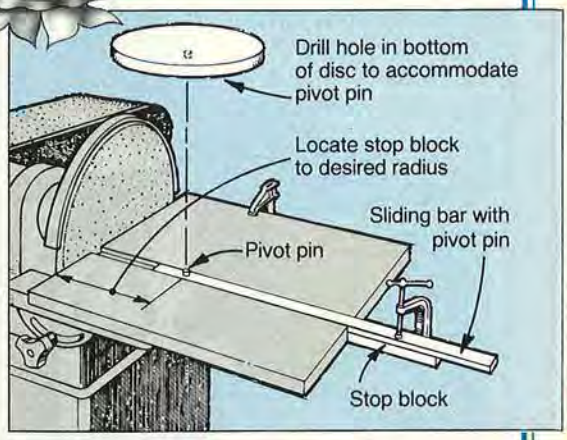
TOP SHOP TIP

Sand perfect circles

It's practically impossible to cut perfect circles for such projects as wheels or small round tables using a bandsaw or scrollsaw.


Drill hole in bottom of disc to accommodate pivot pin
Locate stop block to desired radius
Sliding bar with pivot pin
Pivot pin
Stop block

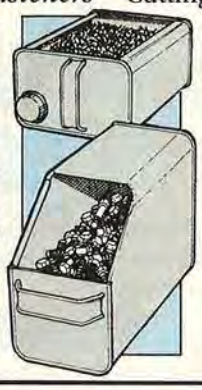
TIP: Try a disc sander to achieve true roundness. First, from ¾" plywood, build an auxiliary table (about twice the size of the table on your disc sander) with a ⅜"-deep slot ¾" wide. Now, fit a hardwood bar a few inches longer than the auxiliary table so it slides freely in the slot. About 1" from one end of the slide, fit a 3⁄32" pin that protrudes ¼" (see drawing). Bore a 3⁄32" hole at the center of the circular workpiece, place it over the pin on the slide, and slowly advance it into the sanding disc. When you reach the scribed circumference, clamp the slide to the auxiliary table and spin the workpiece for a perfect circle.

—Edward Hanselman, Hoosick Falls, N.Y.

For his tip, Edward receives the AEG model STPE 500 electronic jigsaw shown *above*.

A new wrinkle on making storage bins

Most every woodworker accumulates an assortment of fasteners and small parts that requires systematic storage. Otherwise, clutter and chaos soon take over.



TIP: You can easily make storage bins of one-gallon cans used for packaging liquids such as paint thinner. Dave Wilson of Aberdeen, Wash., sent one style (shown at *right, top)* and it appeared in the June 1988 issue. Cutting away the corner diagonally as shown *below left* renders a container of a different breed. Use tin snips to do the shearing and turn over the sharp edges with a pair of pliers and a hammer. The second style creates a container you can pick up by the handle and carry without spillage.

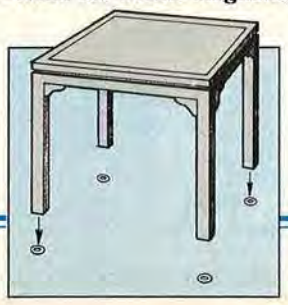
—Clarence R. Evans, Cape May Court House, N.J.

Eliminate "sticky feet" when finishing

When varnishing, applying lacquer, or painting furniture, the wet finish often runs down the legs and makes them stick to the floor or workbench. Pulling them loose can damage your project.

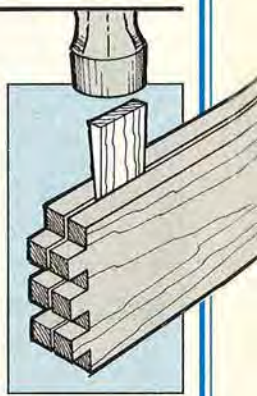
TIP: Eliminate this nuisance by placing flat metal washers under the ends of the legs. If any excess finish accumulates, it's at the end of the leg where it can be sanded away without harming the leg.

—From the WOOD magazine shop



Equal—but not separated

Double-faced (carpet) tape works great for temporarily fastening pieces of stock together when making identical cuts such as finger joints. But, sometimes the adhesive works too well, making it difficult to pull apart the pieces.



TIP: Carefully drive a narrow wedge of softwood between the two pieces. This will force them apart without marring the workpieces. If the pieces still resist separation, splash lacquer thinner on the joint.

—From the WOOD magazine shop

Continued on page 18

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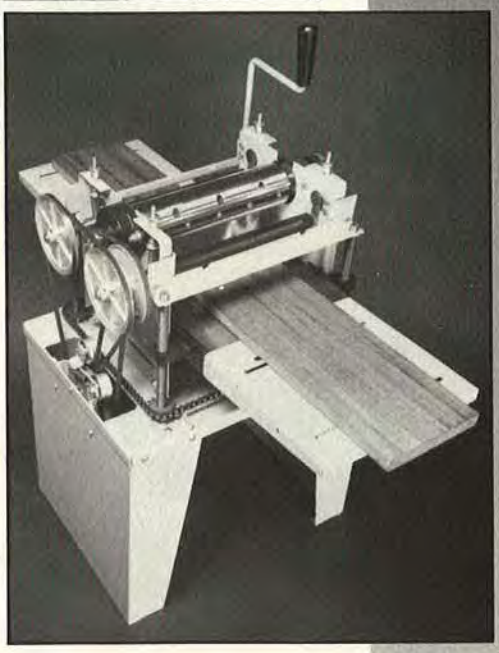

Making your own wood projects is easier, more fun and more economical than ever, thanks to the **RBI Woodplaner — actually four tools in one!** It gives you the capability to create projects like fine furniture, cabinetry, ornate moldings, tongue-in-groove paneling and much more. You'll be the pride of your family and the envy of your friends. You can even use your Woodplaner to earn extra income! Try it just once and you'll see why this amazing tool is the favorite of do-it-yourself woodworkers everywhere!

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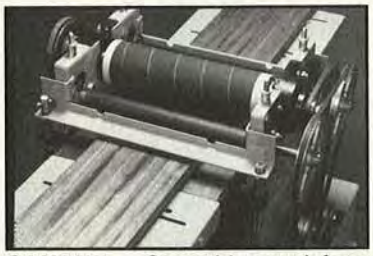

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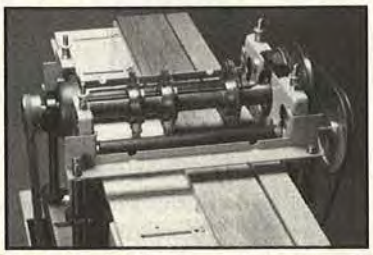
MOLDER – Create custom moldings and decorative picture frames!



GANG RIP SAW – Edge cut and dimension the width of your stock!

☐ *Yes!* Please rush me all the facts on the RBI Woodplaner line and how I can turn my hobby into income!

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Mail the coupon
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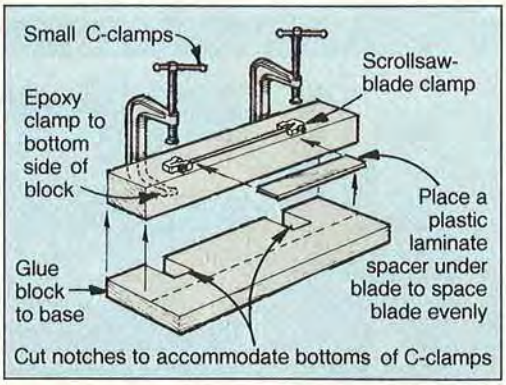
rbi Industries, Inc.
1801 Vine Street, Harrisonville, MO 64701 9005

TIPS FROM YOUR SHOP (AND OURS)

Continued from page 16

This jig makes for easy scrollsaw blade changes

Because of the small pieces involved, putting a new scrollsaw blade into its mounting clamps can be a hair-raising experience—unless you just happen to have three or four hands. With only two hands, by the time you get everything together, the alignment may be off and the set screws not tight enough to secure the blade in place.

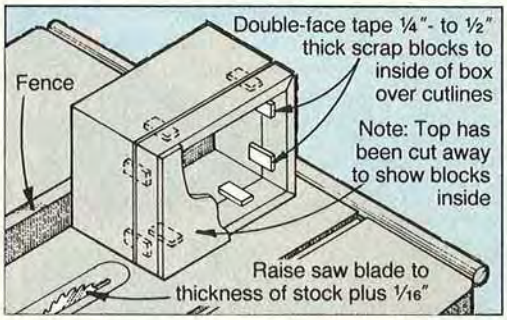

Small C-clamps
Scrollsaw-blade clamp
Epoxy clamp to bottom side of block
Place a plastic laminate spacer under blade to space blade evenly
Glue block to base
Cut notches to accommodate bottoms of C-clamps

TIP: Simplify this irksome job by building a jig that holds everything in place while you tighten the set screws. All you need is a pair of small C-clamps, two pieces of scrap wood about 8" long, and a strip of plastic laminate or thin stock to serve as a spacer. You don't necessarily have to epoxy the C-clamps to the block, but doing so will make for quicker changes.

—John A. Henson, Lakeland, Fla.

Taped gussets simplify cutting loose box lids

Saw blades tend to bind when cutting off lids on wooden boxes, particularly when parting the final side. Consequently, kickback or sloppy cuts may result. Inserting wedges in the saw kerf helps some, but doesn't prevent all binding.


Double-face tape ¼"- to ½" thick scrap blocks to inside of box over cutlines
Fence
Note: Top has been cut away to show blocks inside
Raise saw blade to thickness of stock plus 1/16"

TIP: While assembling the box, tape or hot-melt glue temporary gussets of scrap wood ¼" to ½" thick along the intended saw kerf as shown at *left*. Set your saw blade about 1/16" deeper than the thickness of the walls of the box. After sawing, tap loose the scrap pieces.

—Gerald Hunt, Swartz Creek, Mich.

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It takes something special to become the top name in metal protection. Like the special formula that gives our metal paint more rust-fighting ingredients than other paints. To seal out moisture. Keep its rich color. And make metal last longer.

Now there's a way to protect wood just as well. Naturally, it comes from Rust-Oleum. Rust-Oleum Wood Saver™ is made with our patented formula using Teflon* and other special ingredients to form a superior barrier that resists moisture better than

*TEFLON® Resin is DuPont's registered trademark © 1990, Rust-Oleum Corporation, U.S.A.

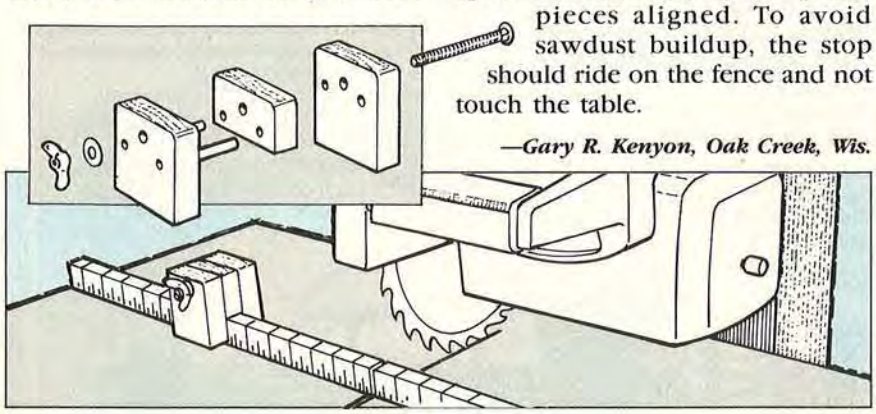
Quick help for accurate cuts

Measuring and marking get real old when cutting parts for a project that requires several duplicate pieces. And, it's nearly impossible to cut pieces of exactly identical lengths using a tape measure.

TIP: When you install a new fence on your radial-arm saw, draw marks at ¼" intervals on both sides of the blade. Or, buy an adhesive-backed rule. Then, you'll always have a ruler to help you instantly measure stock on the table.

To get those exact repetitive cuts, build a clamplike adjustable stop by cutting pieces of scrap as shown in the inset drawing. The middle piece should be slightly thinner than the thickness of the fence. Quarter-inch dowels keep the pieces aligned. To avoid sawdust buildup, the stop should ride on the fence and not touch the table.

—Gary R. Kenyon, Oak Creek, Wis.

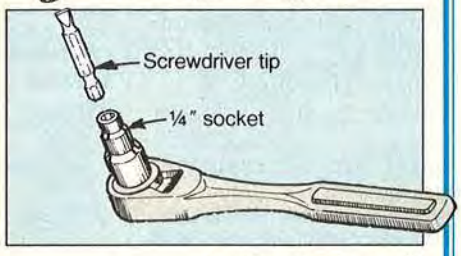


Offset screwdriver reaches tight spots

Sometimes you have to drive a screw in an area where there simply isn't enough room to use a conventional screwdriver.

TIP: You can buy a bounty of screwdriver tips these days, including slotted, Phillips, square, Torx and other bits. For an offset screwdriver, insert the appropriate bit in a ¼" socket or ratchet wrench and proceed. Single-tipped bits work best.

—Ron Odegaard, Appleton, Wis.



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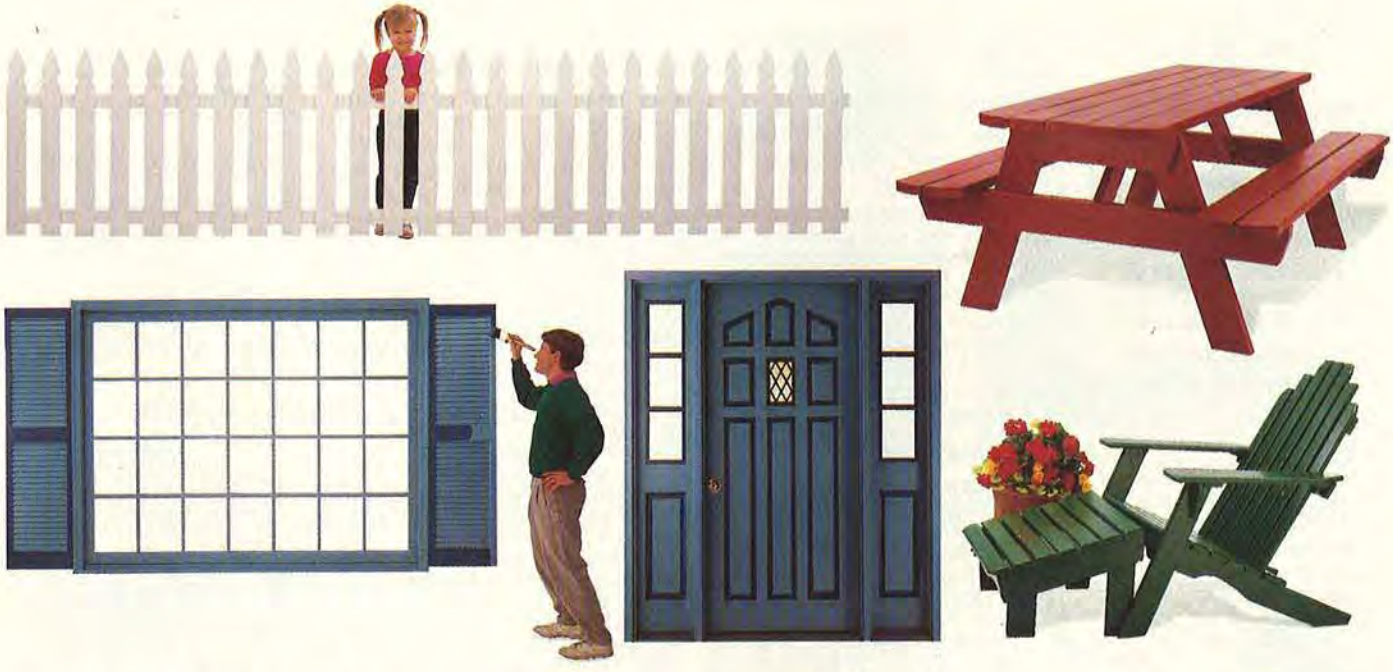

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Super 15" Scroll Saw

On Sale ... **$119.95**
(Includes $52 ***FREE*** Accessories)

Cut intricate wood patterns with this versatile machine. Features:

- **Parallel rocker arm cutting system** - eliminates blade breakage & sanding.
- **E-Z set blade change system** - permanent, upper arm blade holder plus **new** E-Z Jig for standard holders.
- **FREE Accessories** - 1 dz blades, extra blade holders, E-Z set system, Plastic lettering guide set .. a $52 Value

SPECIFICATIONS:
• Cast iron construction • 15" throat • Motor: 1/8 HP, TEFC, 1650 RPM, 110V, UL Listed • 3/4" stroke • 2" depth of cut • Table tilts to 45º • 43 Lbs.

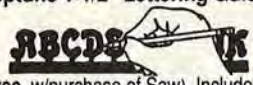
Item #SAW .....$119.95 (UPS $10)

Scroll Saw Accessories

Dust Blower
Installs between lower arm and base - keeps your pattern line visible at all times. Installation instructions included.
#BKT .... **$15.00/Kit** (•)

Saw Stand *(On Sale)*
34" High -perfect height & a great convenience.
#STD ... (Reg $39)
On Sale .. **$26**
(UPS $4)

Neptune 1-1/2" Lettering Guides



(**Free** w/purchase of Saw). Includes upper & lower case alphabet + numbers + free patterns. **#LN1** ..... **$12**/set (•)

Scroll Saw Blades (5")
#BPK - 4dz asst. (2dz Pin, 2dz #9)...**$14**(•)
#BPS - 2dz Spiral blades (size #2)...**$10**(•)

"E-Z Set Plus" Blade Holder System
(**Free** w/purchase of Saw). Includes permanent pivoting blade clamp that mounts to the top arm (Simplifies attaching blades for internal cuts).
Plus our NEW E-Z Jig that makes inserting blades into standard blade holder (in lower arm) simple.
Item **#EZ2**.....**$17** /kit (•)

Magnifier Lamp
Great for magnifying scroll work or closeup work of any kind.

•175% mag
•39" flex arm
• UL approved
• 60 Watts Incand.
#SML (reg 29.95) **On Sale ...$22.95**
(UPS $3)

Foot Switch
"Momentary" (deadman) type - installs in line with Saw power cord. 7 Amp, 6 ft, For hands free operation of Scroll Saw.
#FSW ..... **$ 20.00** (•)

Super 125 Planer

On Sale **$349.95**

This machine will pay for itself time and again by planing your own wood. Finishes wood like machines many times its price.

• **Portable** at 65 lbs • **Power feed** •12 1/2" wide High Speed Steel Knives Shipped assembled and ready to run.

SPECIFICATIONS:
Motor: 16Amp, 115V, 8000RPM, 2HP• 26.2 fpm auto feed rate • 16,000 Cuts/min • Thickness of stock: 3/16" - 6" • 1/8" Max depth of cut • 2 HSS knives
Item #PLA ..... $349.95 (UPS $15)

Planer Accessories

Free plans for Roller Stand with purchase of rollers

Extra Set of 2 Knives
High Speed steel, 12-1/2" long.
Item #PKN .....$25.00/set (•)

Dust Chute
For vacuum takeoff of wood chips.
#PDS ..(reg $24), **On Sale....$15** (UPS $3)

Planer Stand (Heavy duty)
Drilled for Super 125 Planer. 27-1/4"High.
#PST ...(Reg $44), **On Sale...$39/ea** (UPS $6)

Roller Stand
HTC brand support stand w/heavy duty ball bearing roller. Height adjusts from 25" - 44".
#PRS ...(reg $40), **On Sale** ...**$35** (UPS $4)

Ball Bearing Rollers
(Minimum purchase 2 rollers). Build a roller stand, infeed/outfeed table etc. with these 13" X 2" Heavy Duty rollers. Includes **FREE** plans for roller stand shown above.
Item **#BBR** ..... **$6.50/ea** ($3 UPS /order)

Conveyer Section (4'x12")
Sooner or later you'll need one of these. A must for feeding large pieces through planers, table saws, etc.. Steel Channels, 4' x 12" overall, 1-3/8" dia. ball bearing rollers, Wt: 35#. The best value in conveyer sections anywhere !

#BCS ..(reg. $99) , **On Sale $69.00** (UPS $8)

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New Model with 8" disc

Two way 4"x 8" Sander

On Sale ... **$114.95** (UPS $8)
(Includes **$14 FREE** Belts & Discs)

Item #S48

Here's a machine that adds true versatility to your shop.
New design uses **universally available 8"** discs, 4" x 36" belts • Includes Assortment Of 3 Belts, 4 Discs Of Various Grits • **Built in Dust Collection** outlet • Aluminum table: tilts to allow bevel sanding to 45º, includes mitre gauge, movable for use with disc or belt • Belt tilts to any position from horizontal to vertical • **Quick release lever** for changing belts • **Single action tracking** adjustment • Motor 1/3HP, 1720RPM, 115V • Weight : 40Lbs

DC-1 Dust Collector

(Includes $15 ***FREE*** Hose & Fittings)
On Sale .. **$189.95**
(UPS $20)

Item #DC1

Keep your shop clean and safe from saw dust with this large capacity, commercial style system.

SPECIFICATIONS:
1HP • 110/220V (pre-wired 110V)
• 610 CFM air flow • 2ea 20 gal bags
• 4" inlet •Castors on base • WT.: 75 lbs

FREE **With Purchase ($15 Value)**
Dust collection hose • 4" to 3" rigid adaptor • 4" to 2" flex adaptor • Plans for 2 stage setup • Sources for accessories

• 40" Centers • 16" Swing

Item #L40

Wood Lathe XL- 40

Reg $299.95, ***On Sale*** **$249.95**

Includes ***FREE*** 8 piece Wood Chisel Set ... **$34 Value**

Our new XL-40 Wood Lathe surpasses every lathe in its price range with quality & features you would expect from machines many times its price . FEATURES .....

Heavy Duty cast iron construction provides smooth turning action • **40" Centers • 16" Swing** for turning larger bowls • Smooth toolrest movement on 1" solid steel rails • **"Live" center** on tailstock • **Motor mounted for easy positioning** and belt changes • **Sturdy 52" steel base** mounts on table top or optional stand.

PURCHASE INCLUDES:
• Lathe with Motor & Base • Toolrest
• 6" Faceplate • 8 pc wood turning chisel set

SPECIFICATIONS:
• MOTOR: 1720 RPM, 1/2HP, 8AMP, 110V
• 3 Speeds: 660, 1500, 2850 RPM
• Headstock thread - 3/4" x 10 tpi
• Overall length: 60" - Weight : 100lbs

Item **# L40** .....***On Sale*** **$249.95**
(UPS $20)

Lathe Stand
Heavy duty. Wt. 25Lbs
Size: 28"H X 56"L X 21" W
Item **#LST** ..... **$59/ea** (UPS $6)

"MOBILE-K" Air Cleaning System

This new product **removes fine sawdust**, welding smoke, cigarette smoke, paint and oil mist from the air more efficiently than commercial products many times the price.

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TIPS FROM YOUR SHOP (AND OURS)

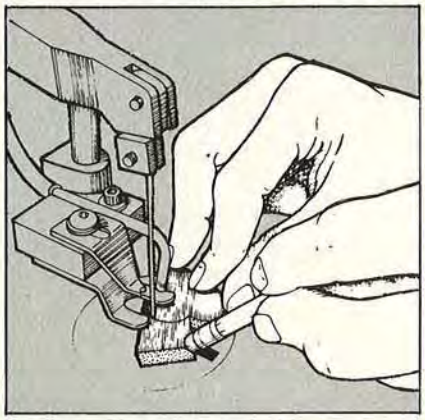
Continued from page 19

Control small pieces with a pencil

Scrollsawing parts from small pieces of stock can be tricky because the blade action tends to lift the wood off the cutting table.

TIP: Press the workpiece against the saw's table with the eraser end of a pencil as shown *below* to guide the workpiece. The rubber tip helps you control the part and follow the cutting line.

—Louis Mouis, Aurora, Ill.



Vinegar takes sticky epoxy off your fingers

Even the most persnickety of workers rarely avoid an oops with freshly mixed epoxy glue. Accidental drips and smears quickly show up on the materials being glued and on the worker's hands. Trying to wipe up these little messes before the epoxy sets up often falls short of the success you'd like.

TIP: Dampen a clean cloth with white vinegar (available in grocery stores) that contains 5 percent acetic acid. Then, wipe up the epoxy before it hardens.

—Walt Easley, Gladbrook, Iowa

Continued on page 22

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When it comes to repairing all kinds of wood, **Elmer's® Carpenter's Wood Glue** is the #1 seller. It grabs fast, sets fast and is heat and water resistant. So it's no wonder we get all the breaks. Available in regular and darker wood formulas.

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High Performance Wood Filler MINWAX®

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TIPS FROM YOUR SHOP (AND OURS)

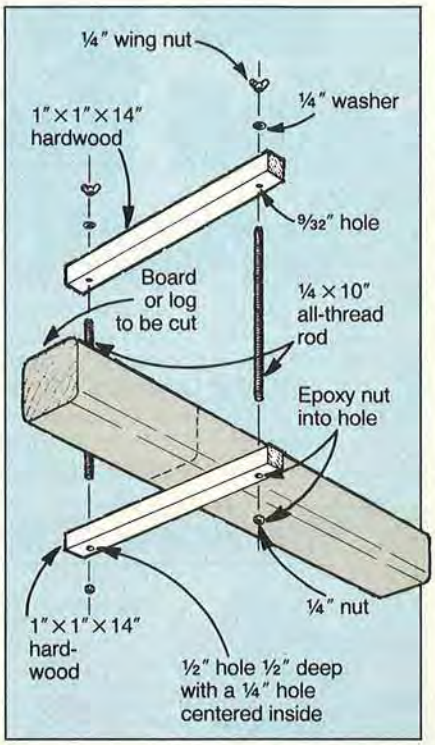
Continued from page 21

Handy guide for cutting thick, irregular stock

Making accurate perpendicular or angular cuts in thick timbers or odd-shaped posts can be troublesome, particularly when you can't make a complete cut from one side. Often the second cut from the back side doesn't match the first cut, leaving an unsightly mismatch.

TIP: Make a great cutting guide from two pieces of 1×1×14" hardwood and two 10" lengths of ¼" threaded rod fitted with nuts and washers as shown at *right.* After measuring the distance between your circular-saw blade and the edge of its base plate, clamp the guide in place. Then, cut one side of the stock to a depth just more than half the stock's thickness, flip it over and cut the opposite side. You can also angle the guide.

—Tom Xedos, Moreno Valley, Calif.



MORE TIPS FROM OUR WOODWORKING PROS

You'll find more useful shop tips scattered throughout this issue of *WOOD* magazine:

- Clamping tiny parts? You can secure them with nails and a substrate covered with waxed paper as shown on page 49.
- On page 55, our featured craftsman substitutes readily available golf tees and wooden drapery rings for toy parts.
- For advice on choosing wood and fasteners for outdoor projects, see the boxed information on page 61.
- Need a jig for reinforcing miter joints? Turn to page 70.
- To avoid slippage and uneven pressure when clamping several pieces together at once, see page 75 for assistance.

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7-pc Set
¼" to 1" in wood case

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- Machined from High-Carbon Steel
- Hardened to HRC 50-52
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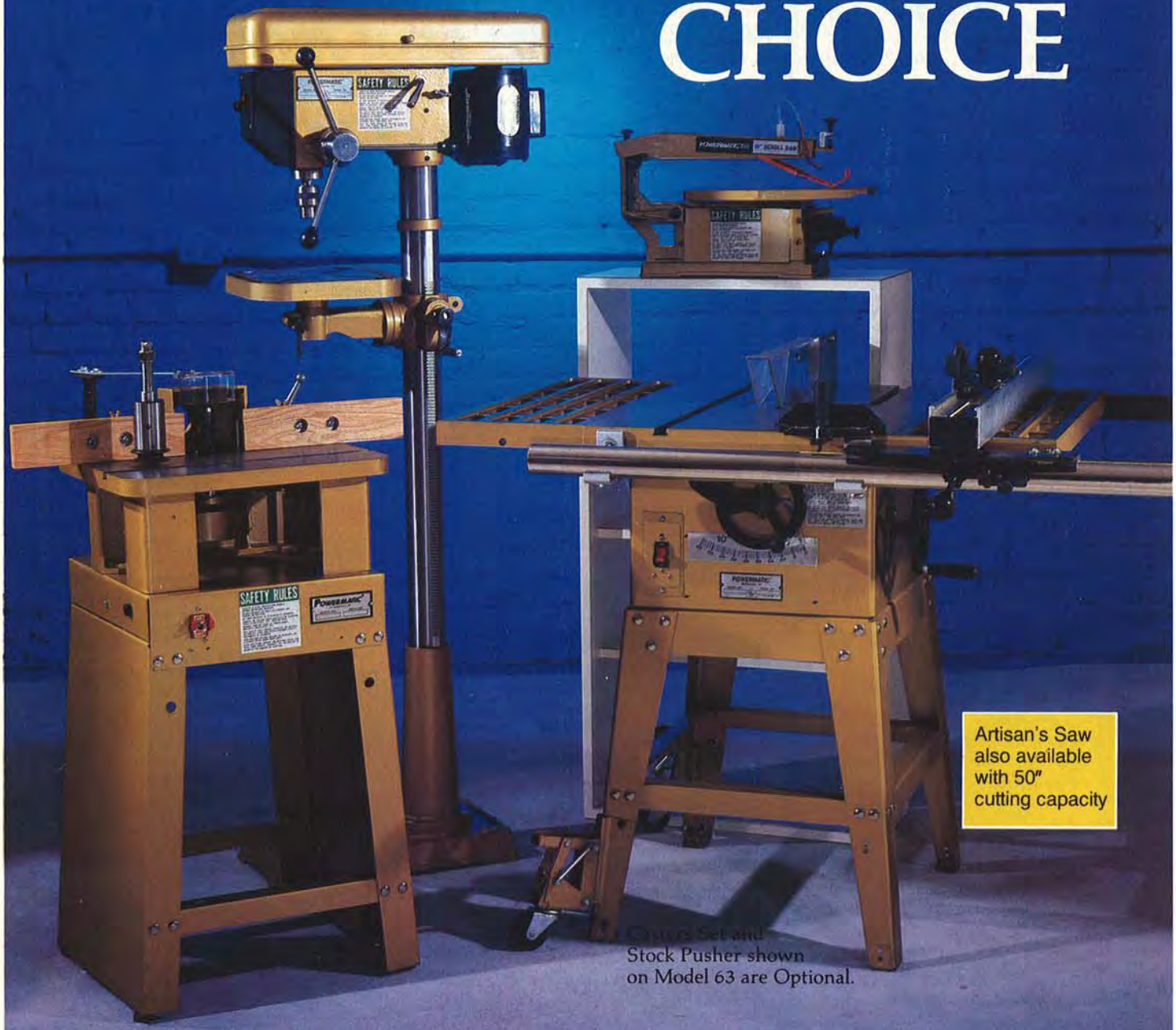

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Double drums.Dust chute.1/4 HP feeding
15" 3 HP
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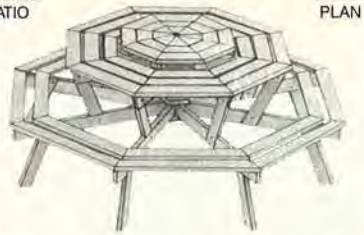
PICNIC PATIO TABLE PLAN



Thom's world-famous functional octagon patio picnic table features a removable seat for handicap access. 7'1" across, seats 8—all in visual and voice contact. Lazy susan, umbrella holder made of 2x4's. Illustrated for cutting assembly, material list and techniques. Patented. $12 check, M.O., USA $. Money Back Guarantee.

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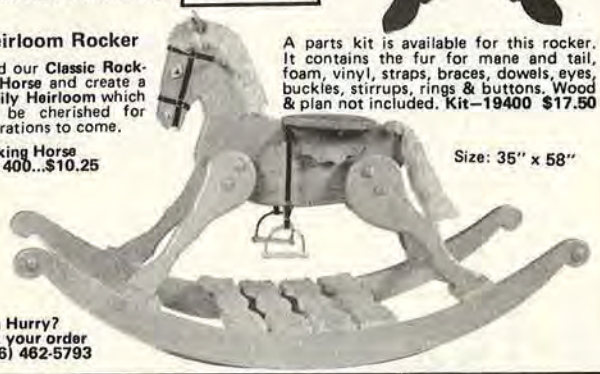

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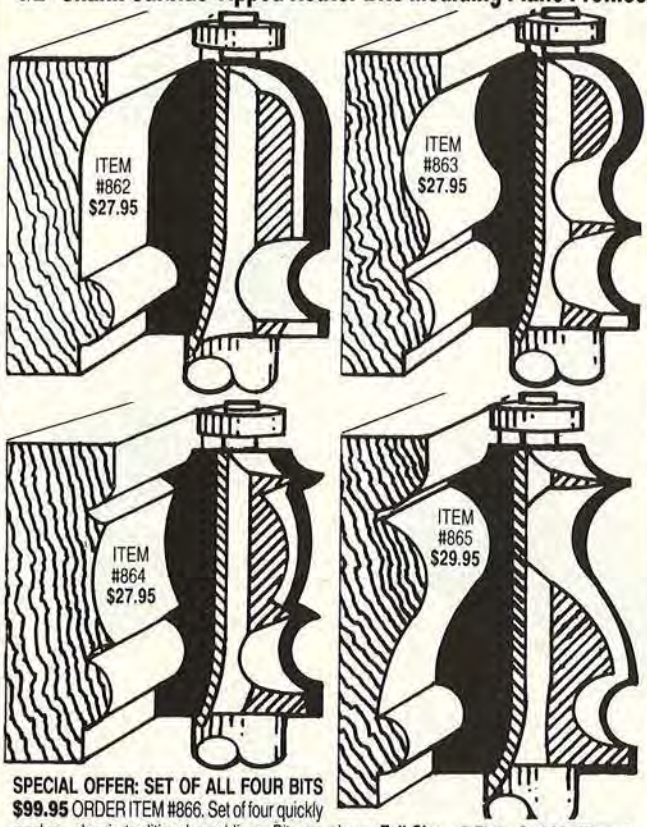

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ASK WOOD

Print this article

Whether your woodworker's license reads "Beginner," "Intermediate," or "Advanced," you're bound to have a few questions about your favorite hobby. We can help by consulting our staff and outside experts. Send questions to:

Ask *WOOD*
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***WOOD®* Magazine**
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Des Moines, IA 50336-1454

We'll answer all questions, but due to the volume of mail, we can't publish every letter. We may edit letters selected for publication.

Post-hole blues

I have a lovely 8'-long turned wooden post that I would like to use as a yard light. How can I drill a center hole down the length of the post for the electrical wire?

—Robert Ward, Norfolk Va.

You're probably not going to like our answer, Bob, but here it goes anyway. You'll have to rip that post into two cross sections, rout a channel down both sides, slip an electrical wire down the middle, and *then glue together the halves.*

Keeping out the rain

Is there a way to seal the edges of outdoor plywood to keep seeping water from separating the plys?

—William Boskey, Beecher, Ill.

Jim Downing, our design editor, has done plenty of work with plywood on the 30' sailboat he's building. From his experience, he'd recommend sealing the plywood edges with regular-set epoxy and then sanding the edges smooth.

Grinding question: How slow?

I recently built my own grinder with a 1,725 rpm ½-hp motor and a 6" white wheel (soft for polishing). With belts and pulleys, I slowed the wheel to 431 rpm. Is this correct, or should the wheel run faster?

—Gerry Goertzen, Steinbach, Manitoba

Our project builder, Jim Boelling, says you can reduce the speed on your grinder to as low as 250 rpm. "You should sharpen fine steel, such as carving tools and bench chisels, at a slow speed," Jim says. "Use higher speeds for general-purpose grinding when you want to remove large amounts of steel."

Continued on page 28

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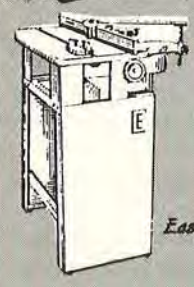

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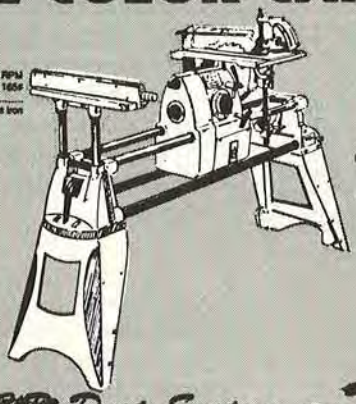

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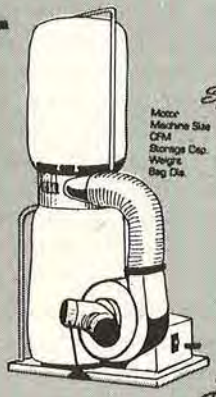

Specs

Motor	2 HP 110/220
Machine Size	34" x 22" x 76"
CFM	approx. 1250
Storage Cap.	Approx. 40 gal.
Weight	140 lbs.
Bag Dia.	21"

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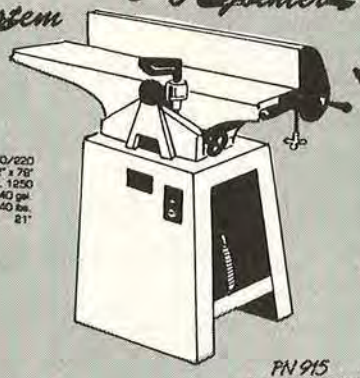

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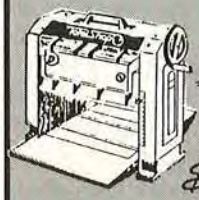

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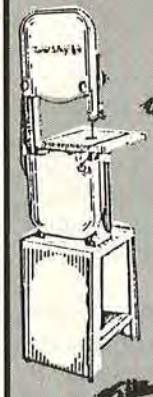

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Table Size	6" X 13"
Table Tilts	0°–45°
Construction	Cast Iron
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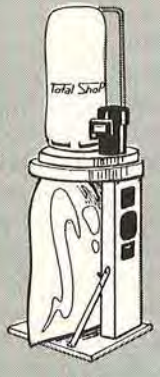

Specs

Motor	1 HP 110
CFM	860
Weight	70# Approx.
Overall Size	24"x16"x64"
Bag Capacity	25 gal.
Bag Dia.	13"
Inlet	4" dia.

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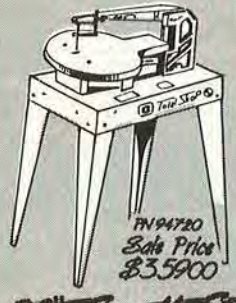

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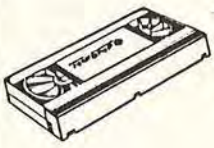

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ASK WOOD

Continued from page 26

Sound advice about door harps

I recently started building wooden toys and wooden projects to supplement my Social Security income. I'm interested in making some door harps, but the plans and instructions I have don't specify the kind of wood to use for the front and back sounding boards. One of the *WOOD* magazine advertizers supplies "resonant" plywood. Can you tell me more about this?

—Gerald Grim, Mt. Airy, Md.

Our sources say resonant plywood is a misnomer, but some plywood has better resonance than others. Jerry Brown at St. Croix Kits (423 S. Main St., Stillwater, MN 55082) says that because of superior tonal quality, craftsmen use spruce-veneer sound boards when they assemble fine instruments such as psalteries, guitars, and dulcimers. Three layers of solid sitka spruce veneer are laminated together for a piece of plywood measuring a little over ⅛" thick. St. Croix sells the plywood for about $7.50 a square foot. For door harps, Jerry recommends ⅛" to ¼" baltic birch plywood, which sells for $1.25 for a piece 10×12". For serious instruments, the straight grain of sitka spruce sustains better vibrations than baltic birch.

Something doesn't smell good

I have built kitchen canisters from ½" oak plywood, and finished them on both sides. I applied Behlen's Salad Bowl Finish to the inside of the canisters, but the smell that lingers after four weeks is overwhelming! What do you suggest I use to finish the inside?

Frank Rennie, Newbury Park, Ca.

Jonathan Kemp, Behlen's national sales manager, recommends that you apply Salad Bowl Finish in light coats, in low humidity, and with good air circulation. Under normal drying conditions, their finish should dry thoroughly after three to four days. He doesn't recommend putting food in the containers until the odor disappears. If you still experience a slight odor, try lightly sanding the final coat and putting a fan near the canisters to speed the drying. "Using oxidized Salad Bowl Finish from a previously opened canned contributes to the odor—an unopened can has a one-year shelf life," Jonathan said.

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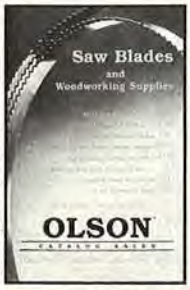

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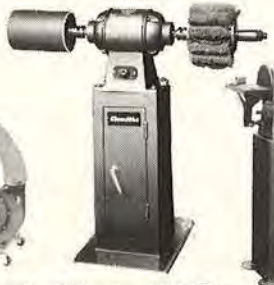

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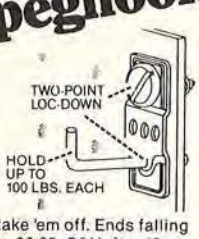

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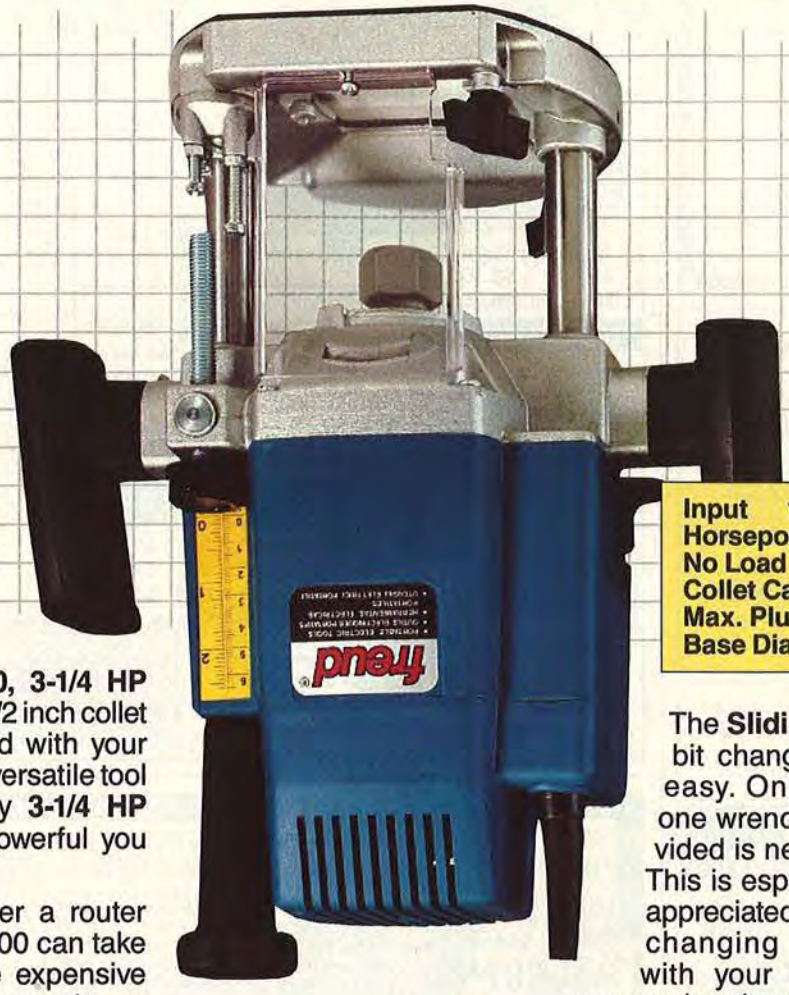

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Black WALNUT

The native aristocrat

Ancient Romans loved walnuts, and thought so highly of the meaty fruit that they planted the tree throughout south central Europe and England. Attention always focused on walnut for its nut crop, while oak prevailed as the choice for furniture.

In America, though, native black walnut has always been prime stock. While frontier families gathered walnuts to eat, city craftsmen worked the dark wood into classic pieces. Today, black walnut continues as the aristocrat of native hardwoods and the hallmark of tradition.

Wood identification

European walnut (*Juglans regia*) carries the names of countries and regions, such as English walnut, French walnut, and Circassian walnut from the Caucasus Mountains along the Black Sea. A walnut (*Juglans neotropica*) also grows in South America.

Illustrations: Steve Schindler, Mike Henry

North America claims two walnuts: white walnut or butternut (*Juglans cinerea*), favored by carvers, and black walnut (*Juglans nigra*). It's black walnut, though, that woodworkers covet.

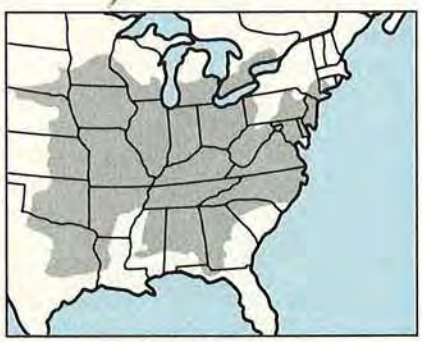
Black walnut's range covers most of the eastern half of the U.S. and southern Ontario. However, prime walnut requires moist, deep, rich, well-drained soil, such as found in the upper Mississippi River valley.

In idyllic conditions, walnut reaches a height of 150′ and a 6′ diameter. More commonly, however, it matures at about 100′ with a 3′ diameter. The tree's thick, dark brown to brownish-gray bark has marked ridges.

Walnut's distinctive leaves measure 1–2′ in length and carry a dozen or more leaflets. In spring, flowing catkins emerge on branch twigs. In mid-summer, nuts appear.

Walnut's heartwood varies from a purplish-brown with thin, dark veins to gray-brown and even orange-brown. The narrow sapwood tends to be white.

Unfigured walnut has straight, somewhat open grain. Figured walnut—fiddleback, burl, stump, and crotch—feels coarse-textured. A cubic foot of dry walnut weighs about 39 pounds, making it just a little heavier than cherry.



Natural range

Uses in woodworking

Walnut remains a favorite for furniture, paneling, musical instruments, turned bowls, relief carvings, and sculpture. Veneer proves popular in marquetry and as furniture accents. Walnut's shock-resistance, strength, and stability, also make it perfect for shotgun and rifle stocks.

Availability

Selling from coast to coast, walnut ranks as our most expensive native hardwood at a cost of about $4 per board foot. It's also offered as plywood, furniture squares, buttons, plugs, turning blocks, and dowels. Plain veneer costs about fifty cents per square foot, but up to $3 for highly figured grades.

Continued

PERFORMANCE PROFILE

black walnut

(Juglans nigra)

Straight-grained black walnut

Crotch-figured black walnut

Machining methods

Black walnut rates as classic cabinet stock not only because of its eye-appeal, but because you get good results with either hand or power tools. It does, however, sometimes require special treatment. *Our suggestions:*

- Black walnut dust can irritate the eyes, so wear protective goggles, a dust mask, and have adequate ventilation or dust removal.
- Avoid any tearout by taking shallow cuts when jointing. And, try this on the planer: Run two short pieces of stock the same thickness as the walnut board through the planer at the same time—one ahead and one behind. This levels the infeed and outfeed rollers for a chip-free cut.
- In crosscutting, attach a backing board to the miter fence to act as a chip breaker.
- Walnut doesn't burn easily in routing, but shallow passes eliminate tearout.
- Any adhesive performs well with walnut, but in joining with white or yellow glues, keep glue squeeze-out to a minimum and skim off skinned-over glue. Dry glue discolors the dark wood and shows up in the finish. (Elmer's new dark glue minimizes this.)
- Straight-grained walnut generally doesn't require filling. Figured walnut—especially burls and crotch wood—has irregular, more open grain that you should fill.
- Staining walnut isn't necessary, unless color is uneven. Then, aniline dyes won't cloud the grain.
- The best finish for walnut is a clear one. Several coats of Danish oil provide clarity. For protection, add a compatible clear topcoat.

Carving comments

Walnut works best for sculptures and large figures with simple lines, or signs and relief carvings. If you do select walnut for a carving project, remember these tips:

- Deep cuts along the grain may cause the wood to pop out.
- Walnut's grain varies from very open to almost closed, depending on where it grew. Each performs differently. Open-grain walnut carves easier. Closed-grain walnut may be more difficult to carve, but it takes a finer finish.

Turning tricks

Walnut turns best at a lathe speed of 800–1,000 rpm, and requires sharp tools. Bowl turners know that walnut's pronounced end grain in the bottom of a bowl tears easily and produces a rough surface that's difficult to smooth. Here's what Arizona turner John Lea does to counter that:

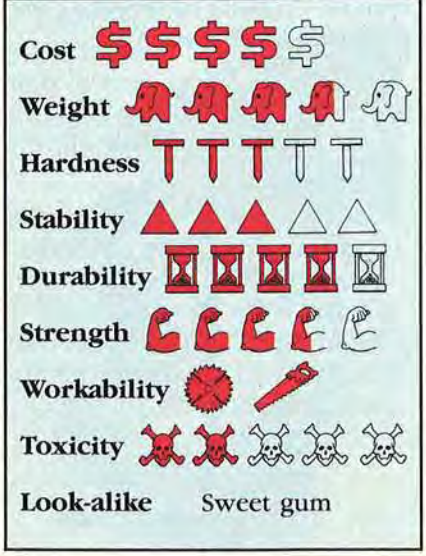
- Leave a little extra thickness—about ⅛" or less—in the end grain at the bowl's bottom. Then, stop the lathe and with a power disc or flap sander, sand the grain down to a slightly lower level than the surrounding wood. Turn on the lathe and sand the remaining wood around the bottom. This method gives you a round bottom instead of the oval shape you get with the uneven sanding done with the lathe on.

SHOP-TESTED TECHNIQUES THAT ALWAYS WORK

Any exceptions, and special tips pertaining to this issue's featured wood species, appear under headings elsewhere on this page.

- For stability in use, always work wood with a maximum moisture content of 8 percent.
- Feed straight-grained wood into planer knives at a 90° angle. To avoid tearing, feed wood with figured or twisted grain at a slight angle (about 15°), and take shallow cuts of about 1/32".
- For clean cuts, rip with a rip-profile blade with 24–32 teeth. Smooth cross-cutting requires about a 40-tooth blade.
- Avoid drilling with twist drills. They tend to wander and cause breakout. Use a backing board under the workpiece.
- Drill pilot holes for screws.
- Rout with sharp, preferably carbide-tipped, bits and take shallow passes to avoid burning.
- Carving hardwoods generally means shallow gouge bevels—15° to 20°—and shallow cuts.

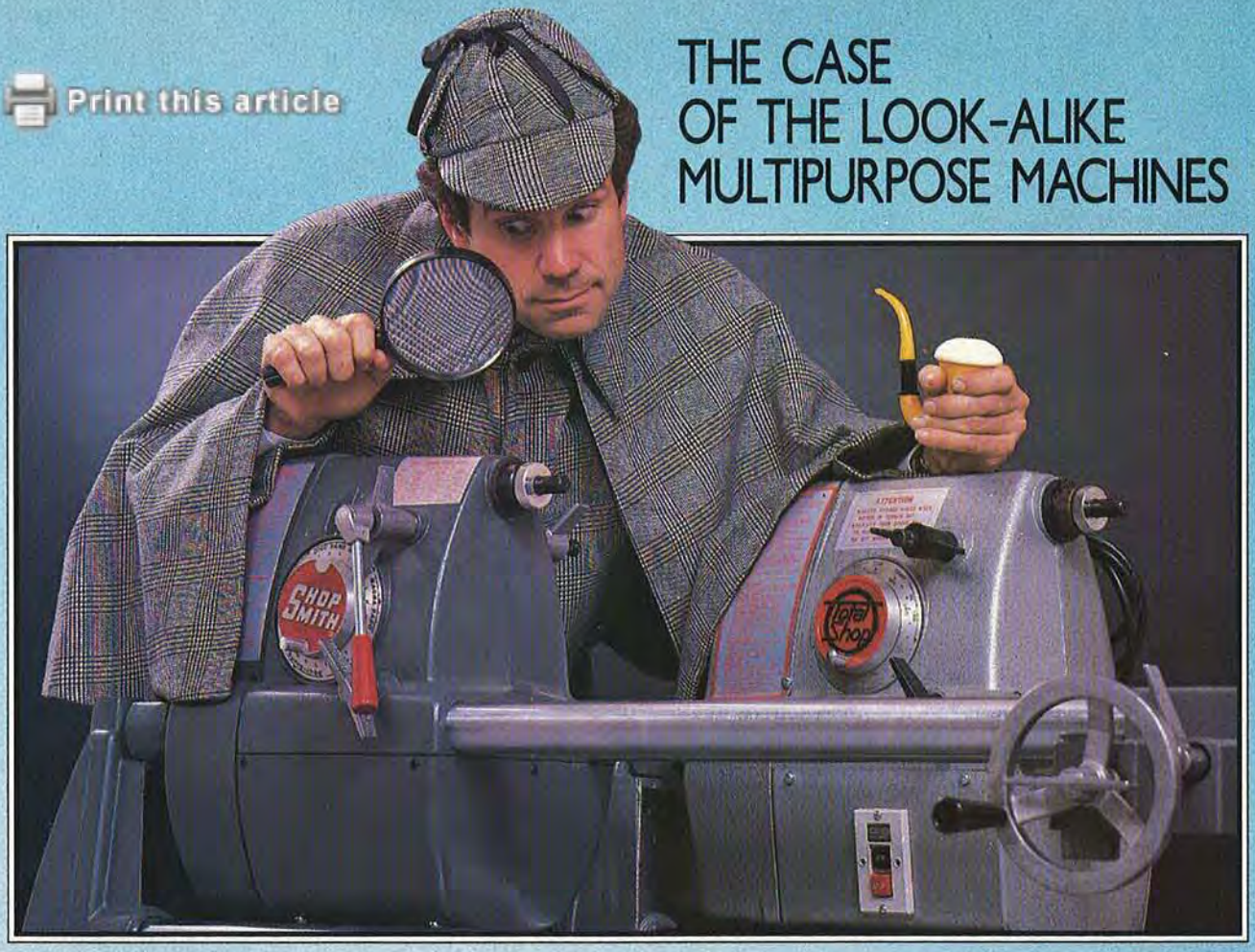
BLACK WALNUT AT A GLANCE



Compiled with woodworkers Jim Boelling, Don Wipperman, Roy Kratz, carver Fern Weber, and turner John Lea

Print this article

THE CASE OF THE LOOK-ALIKE MULTIPURPOSE MACHINES



SHOPSMITH VS. TOTAL SHOP

Chances are at one time or another, you've seen a Shopsmith Mark V demonstration at a woodworker's show, state fair, or shopping mall. Pretty impressive, wasn't it? These slick demonstrations have convinced more than 500,000 woodworkers to buy a Mark V (or a predecessor model) since 1947. And, up until 11 years ago, Shopsmith was the only player in this market niche. Then, Total Shop began importing a similar machine from Taiwan, and has sold between 25,000 and 35,000 units to date.

Nowadays, we hear from plenty of readers who want to know whether they should buy a Shopsmith, or save $150–$300 by opting for a Total Shop. So, we brought both machines into the *WOOD*® magazine shop and put them through their paces. Although the machines look identical, we spotted significant differences under our magnifying glass.

Dr. Goldschmidt with an early prototype.

Times were lean in 1937 when Dr. Hans Goldschmidt packed his engineering degree and fled Nazi Germany. He eventually landed a job as a foreman in a California woodworking shop, and it was here that he started dreaming about a multipurpose woodworking machine.

A few prototypes later, he and a handful of partners formed Magna Engineering Company and began producing Shopsmiths at a Berkeley lumberyard. By 1950, Magna was a nationwide success and in 1958 merged with Yuba Consolidated Industries. The parent company, however, ran into financial difficulties and stopped making Shopsmiths in the 1960s.

In 1971, John Folkerth, then a stockbroker, breathed new life into the Shopsmith line when he visited the closed factory in search of parts for his Shopsmith radial-arm saw. He not only found the parts, but all the molds, dies, and jigs necessary to build multipurpose machines. Within two years, the Shopsmith Mark V was back in production in Dayton, Ohio, and Folkerth was in charge of the new firm.

Continued

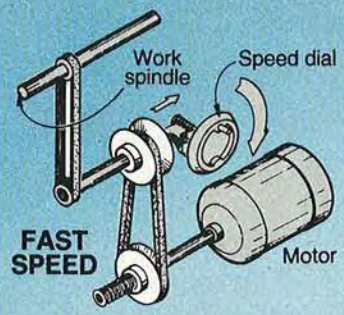
SHOPSMITH vs. TOTAL SHOP

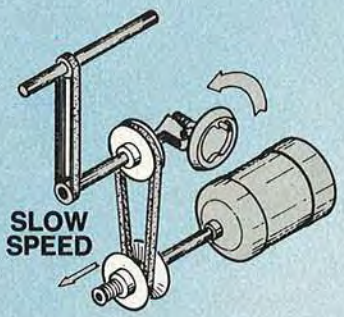
How these machines work

As you can see by the photos, *below,* the Shopsmith Mark V and Total Shop multipurpose machines appear nearly identical until you add a few options.

At the heart of these versatile performers sits a headstock that slides along two tubular ways. The headstock's motor drives an adjustable-pulley system that allows you to dial up variable speeds from 700 to 5200 rpm on the Shopsmith and 850 to 5200 on the Total Shop. As shown in the drawing at *right,* a spring-activated lower pulley changes size as you adjust the size of the upper pulley by turning the speed dial. Both machines have two fixed-work spindles on the left end of their headstocks and a movable quill assembly on the right ends of the headstocks.

Jim Berkeley of Shopsmith's engineering department pointed out to us that a major selling point of his company's machine is its stainless-steel motor shaft. "Stainless steel will not rust, so the motor shaft will not freeze up if the machine is stored in a damp area for a long time." Total Shop's motor shaft is made of steel—not a problem so long as you keep it lubricated.

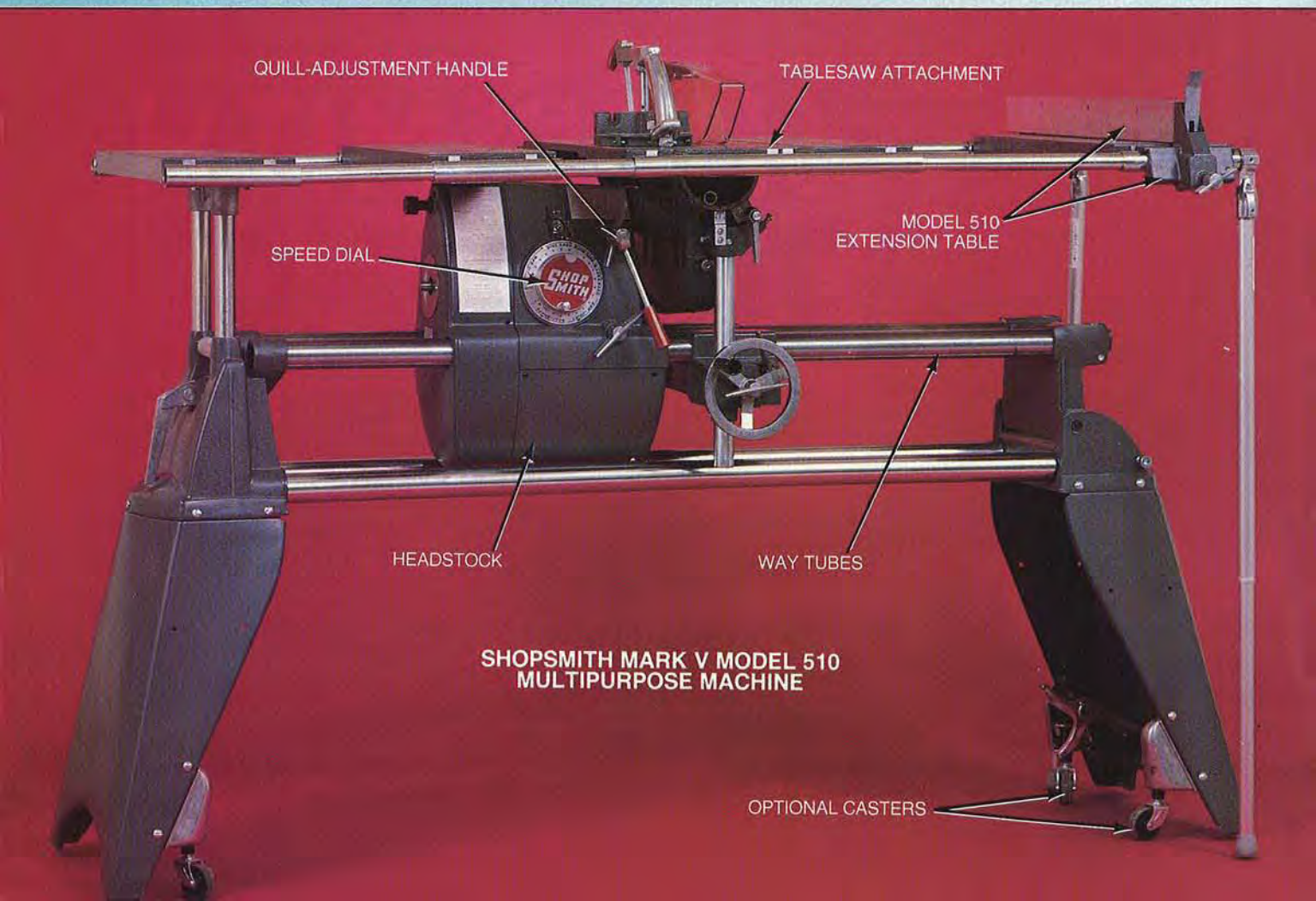




Both machines convert into a 10" tablesaw, 12" disc sander, lathe, drill press, or horizontal borer. From either company, you can purchase an optional 11" bandsaw, 4" jointer, 6" belt sander, scrollsaw, or plate joiner. Shopsmith also offers a 1" strip sander, 12" thickness planer, and lathe duplicator.

The multipurpose-tool advantage

Few woodworking machines pack as much versatility into a 2'×6' floor space as these tools do. And, that can be a mighty important consideration if you're restricted to a small work area.



SHOPSMITH MARK V MODEL 510 MULTIPURPOSE MACHINE

Although these machines will save you some space, they won't necessarily save you a lot of money. For example, you could buy a stand-alone tablesaw, lathe, and drill press of moderate quality for slightly more than the cost of one multipurpose machine. And, the bandsaw, jointer, scrollsaw, and belt sander attachments from either company cost no less than some stand-alone, Taiwanese-made units.

However, both of these multipurpose machines perform some feats that no stand-alone tool can. For example, the variable-speed dial makes speed changes a snap compared to the manual pulley changes required by most lathes and drill presses. When it comes to the disc sander, we don't know of any machine, at any price, that rivals this component. As shown at *right,* the disc attaches to the drill-press quill, which increases your control when you feed the spinning disc into a clamped workpiece. And, because the disc-sander table also serves as the tablesaw top, you can precisely sand compound angles.

Initially, we thought that changing the machines from one function to another would be a big hassle. But, after making all the initial installation adjustments on each tool, most of the changeovers took no more than two minutes.

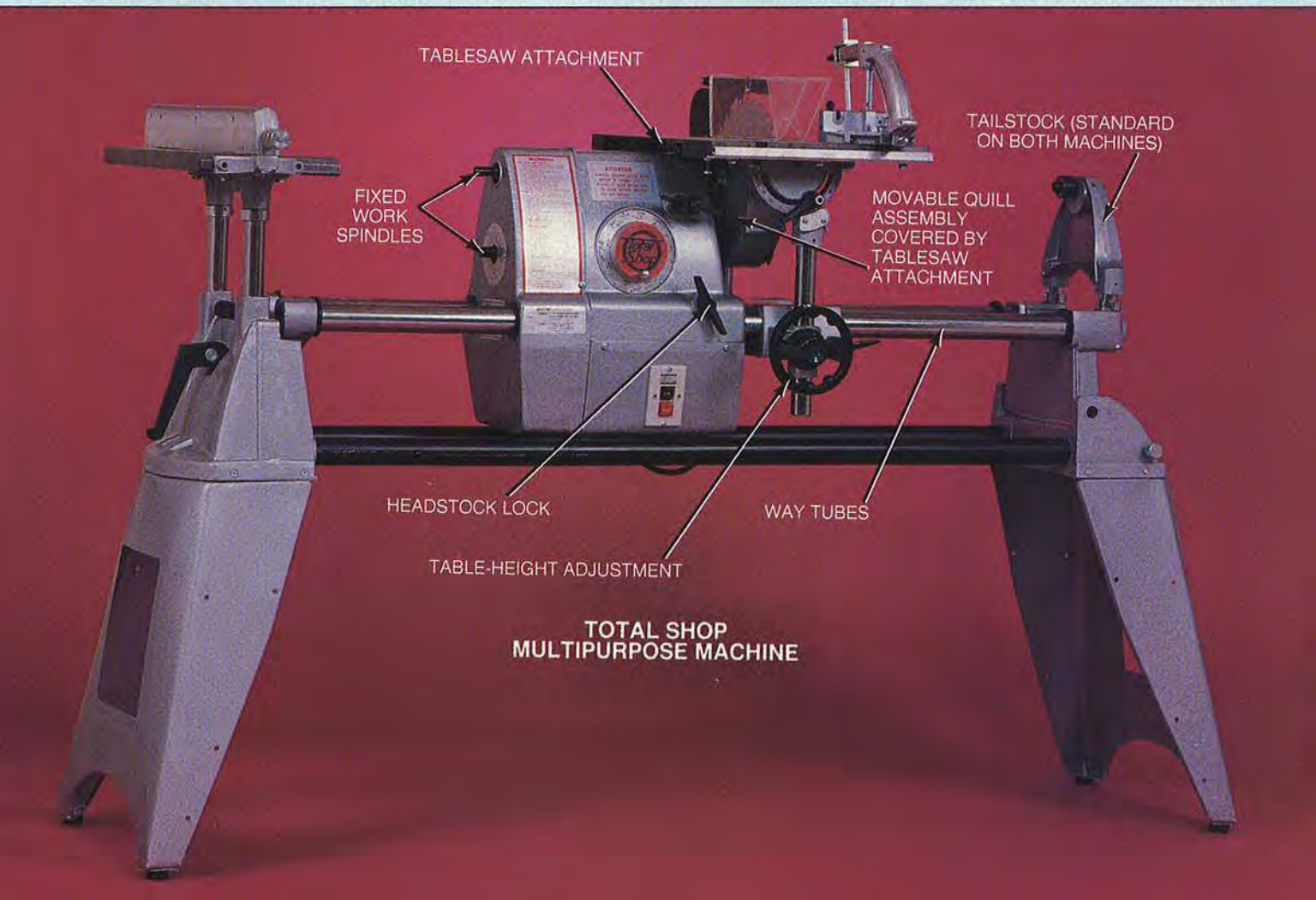
Quality considerations

As with most Taiwanese-made machines, you'll save dollars by buying the Total Shop, but you'll find a slightly rougher fit and finish on most parts. For example, we found that the cranks and handles fit better on the Shopsmith than on the Total Shop. These differences will not prevent you from doing quality work on the Total Shop, but if you want a product with smooth-fitting parts right out of the box, then go for the Shopsmith.

The quill-mounted disc sander moves to the workpiece, giving you greater control over certain sanding operations.

With the units switched ON, the Shopsmith speed-control dial turned easily with one finger curled around its peg, but we had to firmly grasp the Total Shop control with a full hand and put more effort into turning it. As we went through the different speeds, we noticed that the Shopsmith produced slightly less vibration and belt and motor noise.

Continued



TOTAL SHOP MULTIPURPOSE MACHINE

SHOPSMITH vs. TOTAL SHOP

A MATCHUP OF MULTIPURPOSE MACHINES

		SHOPSMITH MARK V MODEL 500	TOTAL SHOP
HEADSTOCK	Voltage	Either 110 or 220	Dual 110 and 220
	Horsepower	1⅛	1½
	Speed range	700–5,200 *	850–5,200
WAYS	Material[1]	C	C, B
	Diameter (Inches)	1.75	1.68
TABLESAW	Material[2]	CA	CI
	Size (Inches)	14×18*	14×18½
	Table tilt	45°R	45°R
	Cutting capacity at 90°	3¼	3¼
LATHE	Distance between centers (Inches)	34	34
	Swing (Inches)	16	16
DRILL PRESS	Quill travel (Inches)	4½	4½
	Chuck capacity (Inches)	½	½
	Table tilt	90°R	90°R
DISC SANDER	Material[3]	S	A
	Diameter (Inches)	12	11¾
Weight (Pounds)		198	248
List price		$1,599	$1,495
Demonstration price		**	$1,059
Country of origin[4]		US	T

*Mark V also available as model 510 with 17½×22" table.
**Shopsmith offers $250–$400 in merchandise and cash discounts with demonstration purchases.

1. (C) Chromed steel
   (B) Black-anodized steel

2. (CA) Cast aluminum
   (CI) Cast iron

3. (S) Steel
   (A) Aluminum

4. (US) United States
   (T) Taiwan

Manufacturers listing:

Shopsmith
3931 Image Drive
Dayton, OH 45414-2591
800-543-7586

Total Shop
P.O. Box 16297
Greenville, SC 29606
Outside S.C.: 800-845-9356
S.C. residents: 803/228-4174

COMPARISON OF 3 MAJOR TOOLS

• Drill press

With the headstock and upper tubes in their normal, horizontal position, these machines make precise horizontal borers. You'll especially appreciate this capability for drilling dowel holes. To convert the machines to a drill press, you simply rotate the headstock 90° by pivoting the upper tubes from a horizontal to vertical position. Both machines work well in this respect, but neither turn slow enough for many drilling operations. Since the Shopsmith has a low speed of 700 rpm, and the Total Shop turns no slower than 850 rpm, both machines can damage larger drill bits, especially in hardwoods. In response to this problem, Shopsmith manufactures a speed reducer that slows the spindle speed to 100 rpm. Price: $199. Shopsmith tells us this speed reducer will fit Total Shop machines as well.

• Lathe

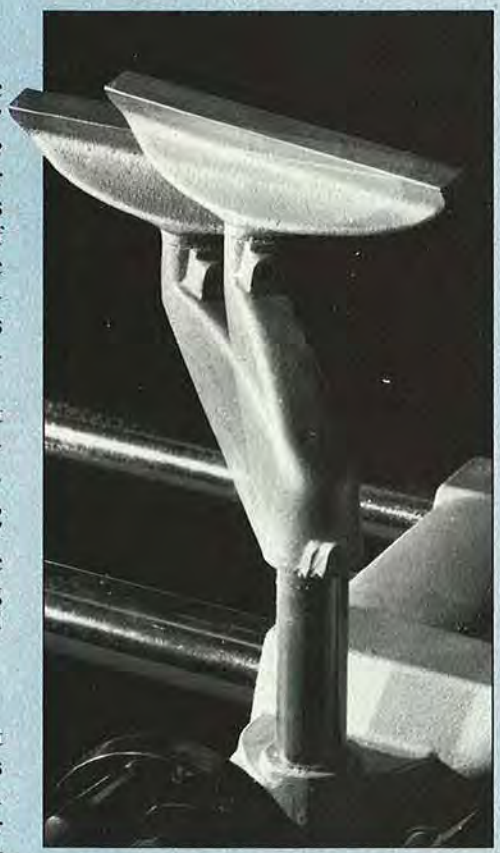
We've heard people refer to these machines as being "lathe based," and it's easy to see why. They *look* more like a lathe than any other stationary machine. Both machines work well as a lathe, but because of their ⅝" spindles (small by lathe standards) you'll experience vibration with larger turnings such as bowl blanks more than 8" in diameter and 4" in thickness.

As we did some test turnings, it didn't take long to discover a problem with the Total Shop tool rest. Even when locked into position, the tool rest pivoted more than 1" as shown in the double-exposure photo at *right*. This shortcoming could prove dangerous to you and your project.

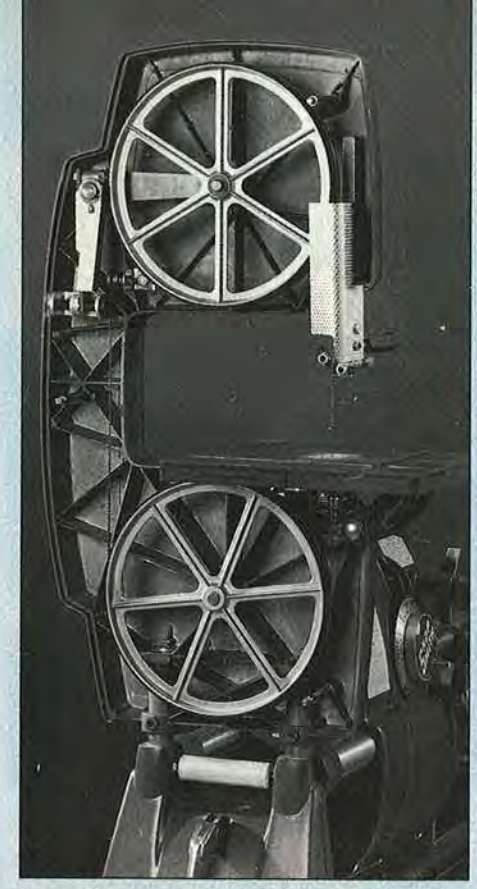
• Tablesaw

Although these machines excel at certain operations, their tablesaws disappointed us. The reason: Both tabletops seem undersized in our opinion. The tops measure about 14" wide by 18" deep, with only 6" of surface in front of the blade. We spoke with several Shopsmith owners, and they agreed that crosscutting wider pieces challenged them. And, since the blade doesn't tilt, sheet goods can be nearly impossible to handle on the tilted tabletop. Because of these limitations, it didn't surprise us when several of the Shopsmith owners told us they owned stand-alone tablesaws, but really enjoy using the other functions. Shopsmith addressed these shortcomings with the larger (17½×22") table and extensions of the model 510, which has about 8" of tabletop in front of the blade.

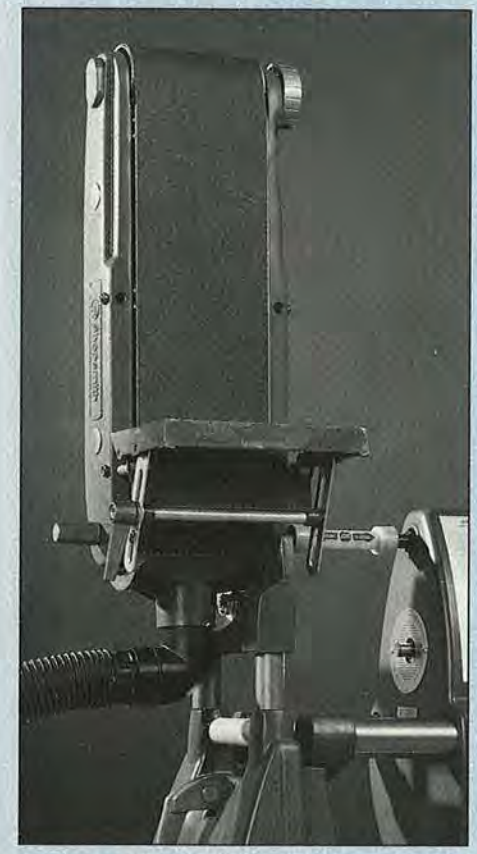
We found the lighter cast-aluminum top on the Shopsmith considerably easier to lift into position than the cast-iron Total Shop table. But once in place, we preferred the cast-iron surface because it proved smoother and more durable than the Shopsmith table.



Even when locked in place, Total Shop's tool rest pivots more than 1"—something to consider if you're a turner.



A look inside the Shopsmith bandsaw reveals its inner workings, including automatic blade-tracking control.



Although nearly identical to the Total Shop belt sander, the Shopsmith unit has a swiveling 2½" dust port.

MORE BUYING POINTS TO THINK ABOUT

• Major accessories

We found the jointer and belt sander accessories similar in most respects, but the companies have taken different routes in manufacturing their bandsaws. The biggest difference: Shopsmith builds an auto-tracking mechanism into this accessory, whereas the Total Shop has the standard adjustments for blade tracking. We found the auto-tracking control hard to adjust for different blade types and sizes.

The bandsaws also proved to be the bulkiest and most difficult accessories to lift into place, so Shopsmith's use of plastic for the housing cover makes good sense. Both machines have cast-aluminum housings, but Total Shop also has a cast-aluminum cover that helps add 11 pounds to the accessory.

Shopsmith manufactures a wider line of additional accessories, large and small. Although the patent on the Mark V has long since expired, company representatives say they hope to obtain patents on new accessories such as the plate joiner and speed reducer.

• Customer service

To their credit, both companies offer a 1-year warranty, a 30-day full-refund period, and a toll-free customer service number. However, the headstock-repair programs have some significant differences.

Shopsmith has 45 stores in the U.S., and three in Canada, that you can take your machine to for service. Shopsmith will loan you a headstock during the repair period, and will pay freight to and from the factory for both your headstock and the loaner if you're not near a Shopsmith store.

Total Shop doesn't have a repair network, but Wayne Preston of Total Shop told us that doesn't pose a problem because "Ninety-nine percent of the time, an owner can make a repair after we supply him with the parts. We also repair headstocks here, and provide loaners, but we haven't had to send out a loaner in three years." If you can't make a headstock repair, Total Shop most often will arrange to have a local motor shop make the repair. On any repair shipment you make to Total Shop, you pay for the freight to them, and they pay the return freight.

• Owner's manual and other little extras

Both machines have the kind of extensive owner's manuals (about 100 pages each) that we would like to see included with all woodworking machines.

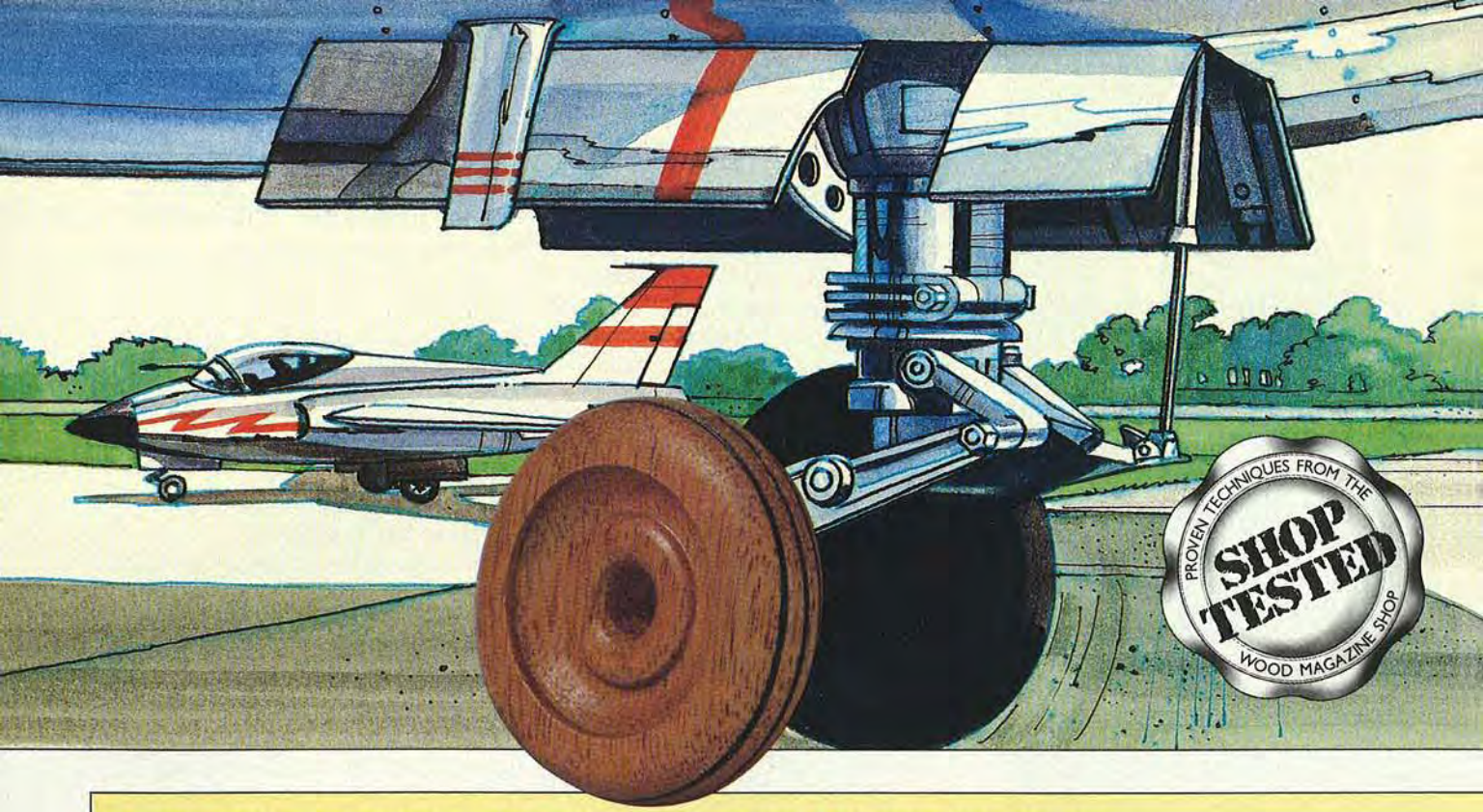
Shopsmith also includes the 360-page book *Power Tool Woodworking for Everyone,* a self-study guide, and a video tape on setting up and adjusting the Mark V. You'll also receive three "Heirloom Projects" packages. One package covers woodworking fundamentals. The other two contain plans, instructions, and a video covering any one of 12 different projects of your choice. If you can get to a Shopsmith store, the company offers a free one-day seminar on operating their machine.

• The bottom line: price

It's not surprising that most of these machines sell at demonstrations—you really need to see them in operation to appreciate their many talents. To learn the site of the next demonstration in your area, call each company at the toll-free numbers listed on page 38. You'll not only save money on either machine by buying it at a show, but you'll also save freight charges.

The Total Shop machine lists for $1,495, and sells for $1,059 with additional discounts or free merchandise at shows. Shopsmith lists its machine at $1,599, but gives you between $250 and $400 off that price in merchandise or cash discounts at demonstrations.

Written by Bill Krier
Technical consultant: George Granseth
Photographs: John Hetherington
Illustrations: Kim Downing; Bill Zaun

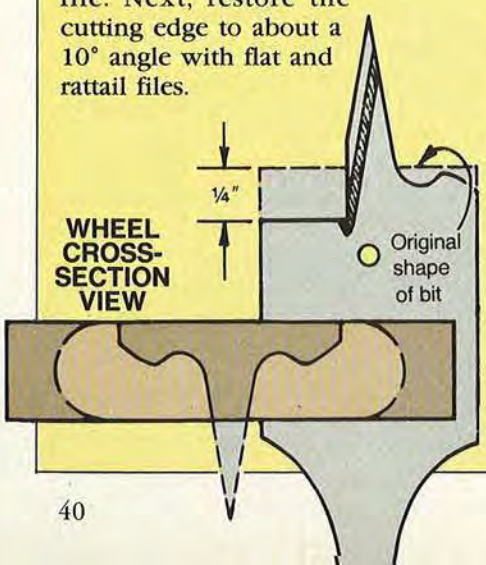


A SIMPLE WHEEL WITH AERODYNAMIC STYLING

To get things rolling, we'll walk you through the procedure for the easy-to-make wheel shown *above.* You can fashion this little gem in a matter of minutes, then mount it on anything from simple pull toys to airplanes.

Give the wheel character with a modified spade bit

You can add a fancy touch to most any wheel by modifying an old spade bit. To shape a 1⅛" spade bit to the profile shown *below,* first lower one side of the bit about ¼" on a grinder. Then, tightly clamp the bit in a machinist's vise and create the curved side with a rattail file. Next, restore the cutting edge to about a 10° angle with flat and rattail files.



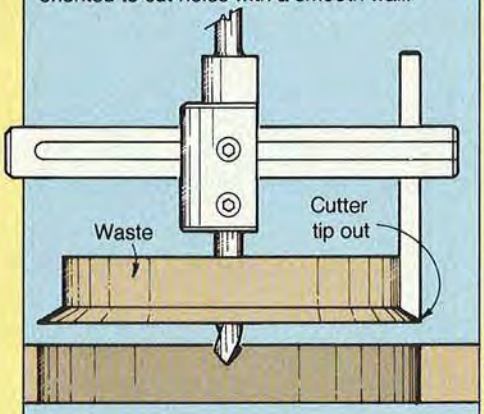
These modified spade bits tend to tear the grain of some softwoods, but we had good results in ½"-thick hardwoods such as red oak, walnut, maple and Honduras mahogany. To keep this grain tearing to a minimum, ease the bit slowly into the wood as you approach the final depth.

To make the best use of your time, mark all the wheel centers, then perform the following operations on all of the wheels before moving onto the next step. For these 1¾"-diameter wheels, we suggest you space the centers 2¼" apart. With your drill press set to 1,500 rpm, slowly lower the spade bit into scrap wood to a depth that leaves a full bead (about ¼") according to the wheel cross-section view at *left.* Once you're satisfied with the depth of the cut, set the depth gauge on your drill press.

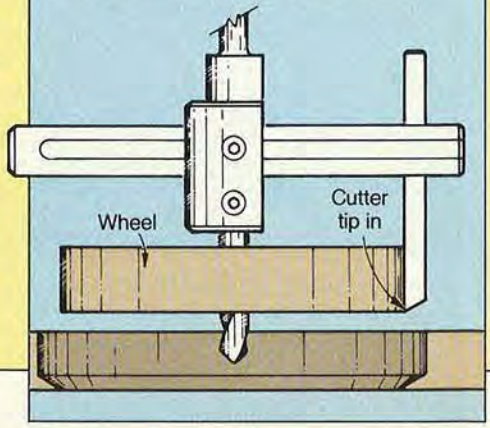
Using the illustration at *right* as a guide, set your circle cutter for a ⅞" radius, reduce the drill-press speed to 500 rpm or less, and cut the outside perimeter of the wheels as shown on the opposite page. When using a circle cutter, remember to clamp the workpiece to the drill-press table.

HOW TO GET THE MOST FROM YOUR CIRCLE CUTTER

Cutting holes: When purchased, the cutter is oriented to cut holes with a smooth wall.



Cutting wheels: Rotate the cutter 90° to produce a wheel with smooth sides.

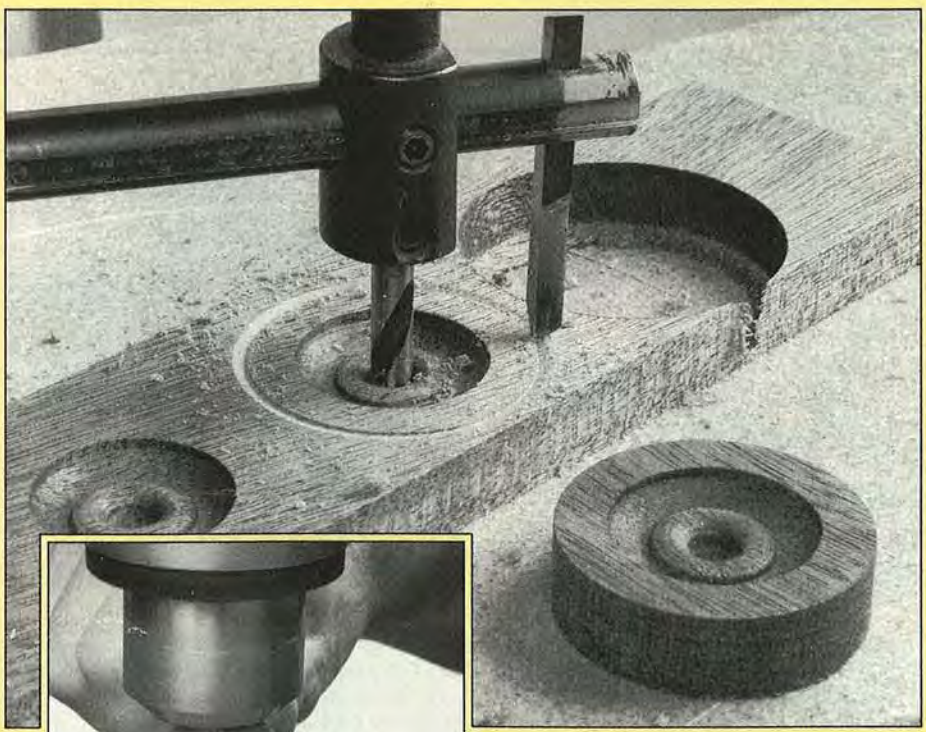


YOUR PROJECTS WILL TRAVEL IN STYLE ON THESE 4 FUN-TO-MAKE WHEELS

Car manufacturers have known for years that a great-looking set of tires and rims can transform a ho-hum auto into a real standout. Now, you can perform the same magic on your next project.

Print this article

We always knew that *WOOD®* magazine's design editor, Jim Downing, is a big wheel in the woodworking shop. So, it didn't surprise us when he responded to our request for a few great wheel ideas. We also tapped the expertise of loyal reader Ed Dohm of White Cloud, Michigan. Ed was one of more than 400 readers who sent a toy into our first-ever Design-A-Toy™ competition in 1989. His monster truck didn't win a prize, but we were so impressed with his heavy-duty tires that we just had to find a way to share them with you. In case you're interested in building Ed's truck, you'll find the complete plans on page 46.



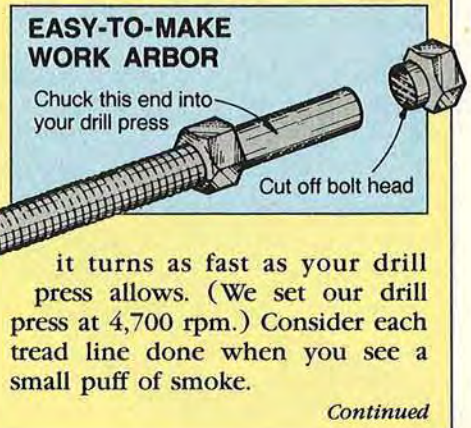
Keep your hands at a safe distance when using a circle cutter.

Use the back edge of an old hacksaw blade to burn in the tread lines.

Here's how to true and shape the wheel

To get started, make a work arbor similar to the one shown *below* from a ¼×3"–4" bolt. Place the wheel between the two washers, tighten the nuts, and chuck the nonthreaded end of the arbor into your drill press. Now, set your press for 750 rpm, and shape the outside of the wheel with a rasp. Remember to move the rasp continuously for a smooth, rounded wheel.

After sanding the tire smooth, burn in the three tread lines with a hacksaw blade as shown at *left*. To do this, grip the ends of a full blade and hold the *non-toothed, back* edge of the blade against the tire as it turns as fast as your drill press allows. (We set our drill press at 4,700 rpm.) Consider each tread line done when you see a small puff of smoke.



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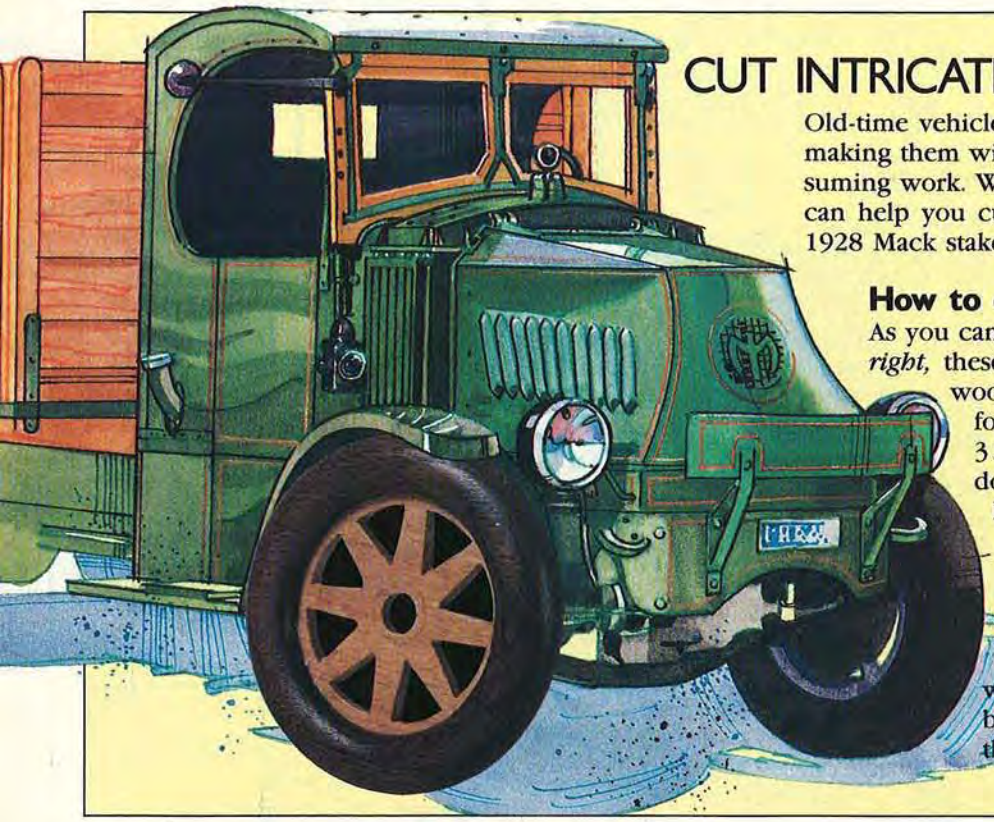


CUT INTRICATE WHEELS WITH YOUR

Old-time vehicles just cry out for spoked wheels, but making them with dowels can be tricky and time-consuming work. With a minimum of fuss, your scrollsaw can help you cut wheels like the one shown on the 1928 Mack stake-bed truck at *left*.

How to cut four rims at once

As you can see by the exploded-view drawing at *right,* these wheels consist of a scrollsawed plywood rim inside a solid-wood tire. To cut four rims at once, stack together four 3×3″ layers of ⅛″ birch plywood. Place double-faced tape between each layer to hold the stack together. Then, transfer one of the full-sized rim patterns shown *above right* to the top of the stack. Drill the ¼″ axle hole. Now, carefully cut on the pattern lines, going along the outside diameter last, with your scrollsaw. If the stack resists being pried apart, soak it in lacquer thinner and try again.

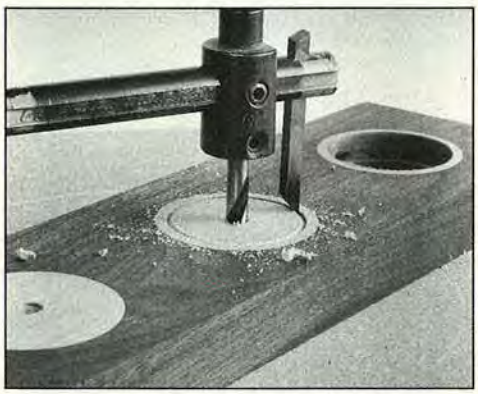
RETURN TO THE '50s WITH THESE WHITEWALLS

Jim Downing must have been daydreaming about his first car—a '57 Chevy—when he came up with this wheel. Jim made the tire shown on the opposite page out of ¾″ and ⅜″ walnut and ⅜″ maple.

Seven simple steps and you're done

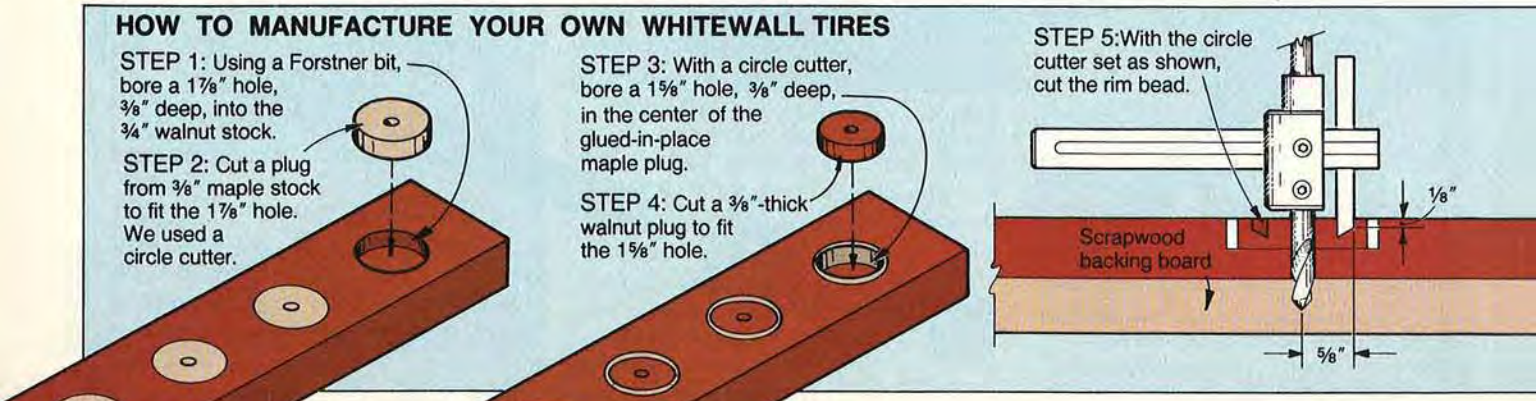
With a little bit of patience and the step-by-step instructions shown *below,* you can turn out a set of these wheels in about the time it takes to watch one rerun of "Happy Days." As you go through the steps, keep these tips in mind:

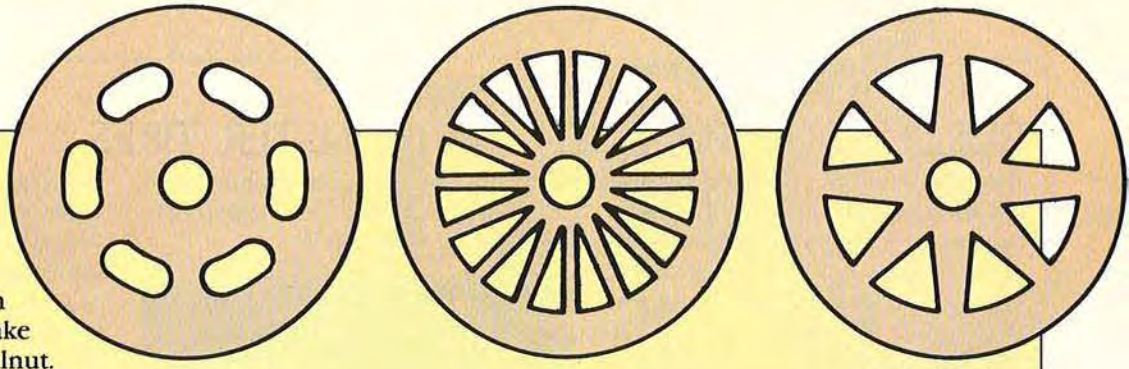
- To cut plugs that fit perfectly every time, make test plugs from scrap stock. If you don't have access to ⅜″ stock, insert ¾″-thick plugs and saw them off to within 1⁄16″ of the stock surface.
- When gluing the plugs in place, apply adhesive to only the walls of the plugs. This allows you to cut away and remove the centers later, as we're doing at *right*.
- After step 7, mount the wheel on a work arbor, and shape it according to the Section View shown at *right*. Then, drill a ½″ hole, 3⁄16″-deep, in the center of the wheel to



Glue only the walls of the plugs so you can cut and remove their centers with a circle cutter.

HOW TO MANUFACTURE YOUR OWN WHITEWALL TIRES

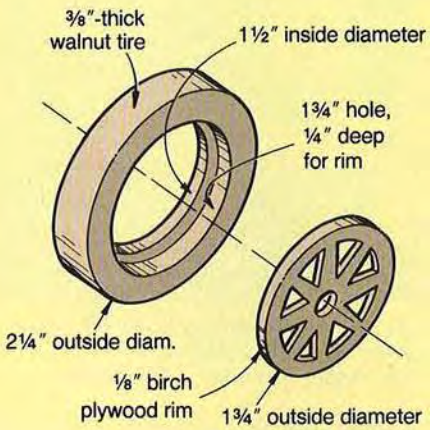

STEP 1: Using a Forstner bit, bore a 1⅞″ hole, ⅜″ deep, into the ¾″ walnut stock.
STEP 2: Cut a plug from ⅜″ maple stock to fit the 1⅞″ hole. We used a circle cutter.
STEP 3: With a circle cutter, bore a 1⅝″ hole, ⅜″ deep, in the center of the glued-in-place maple plug.
STEP 4: Cut a ⅜″-thick walnut plug to fit the 1⅝″ hole.
STEP 5:With the circle cutter set as shown, cut the rim bead.
⅛″
Scrapwood backing board
⅝″



SCROLLSAW

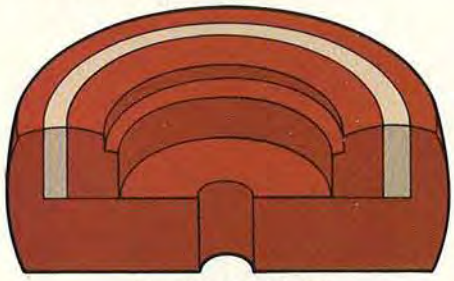
Make a balloon tire for old time's sake

A spoked rim deserves an appropriate tire, so let's make a balloon tire from ⅜" walnut. First, mark a series of centerpoints, spaced at least 2½" apart, on the backside of the walnut. With a compass, draw a 2¼"-diameter circle at each mark. Then, at each centerpoint, cut ¼"-deep holes with a 1¾" Forstner bit. Center a 1½" Forstner bit in the holes you just made and bore clear through the wood. Moving over to your scrollsaw, cut along the outside of the tires, being careful not to creep inside the line. Now, glue the rims into the tires. After the glue sets, mount the tire on a ¼" work arbor and round over the edges. Finally, clean up any scrollsaw boo-boos on the rim as shown at *right*.

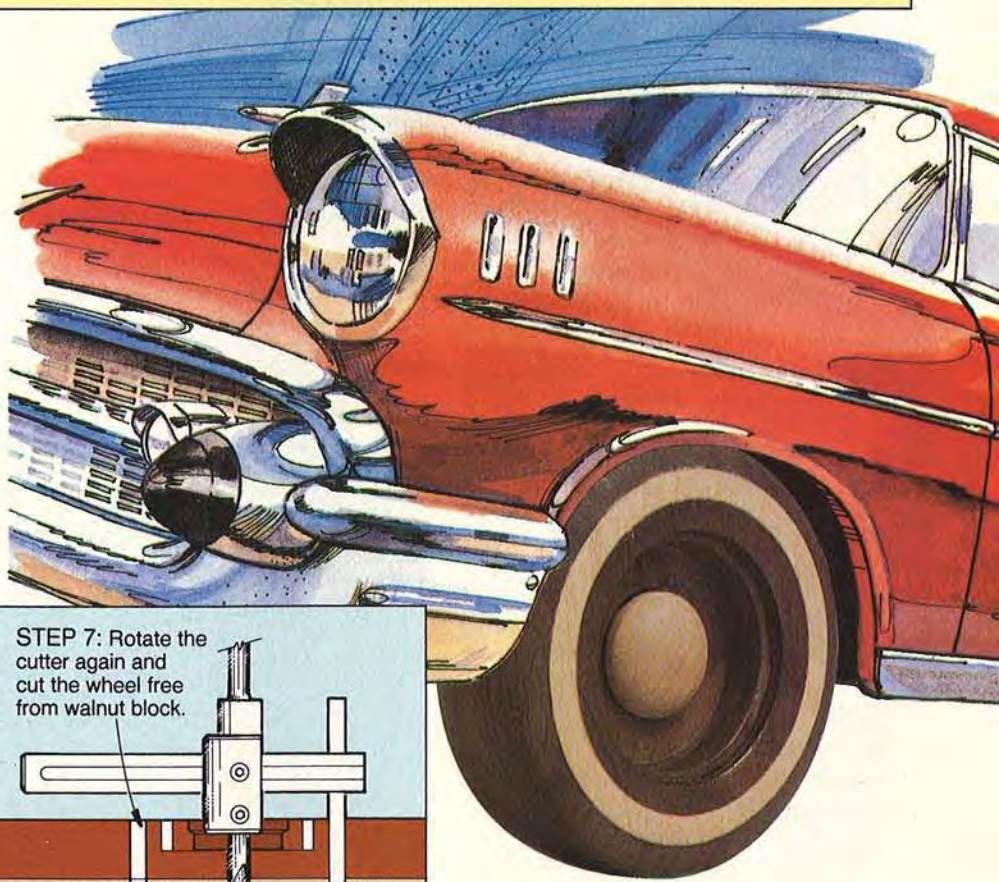


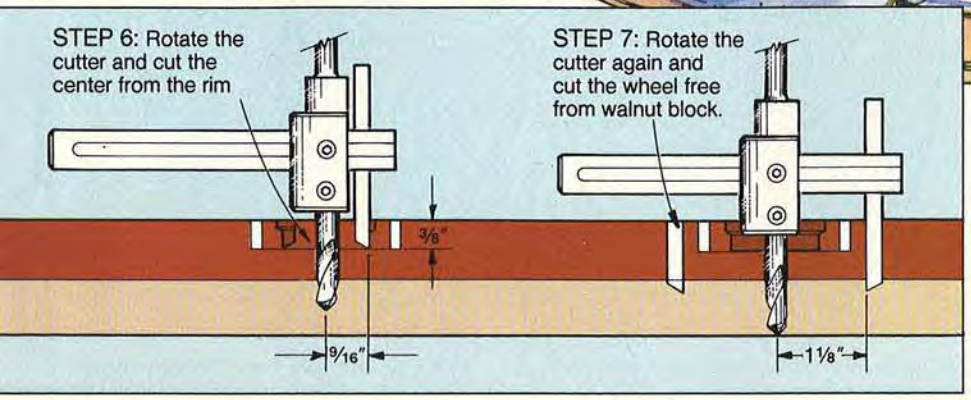
Small riffler files help you clean up scrollsaw cuts, even in the tightest spots between the wheel spokes.

accommodate a baby-moon hubcap. You can either shape your own hubcaps from dowel stock, or buy ½" birch mushroom-head screw-hole plugs.



SECTION VIEW




STEP 6: Rotate the cutter and cut the center from the rim
3/8"
9/16"
STEP 7: Rotate the cutter again and cut the wheel free from walnut block.
1 1/8"

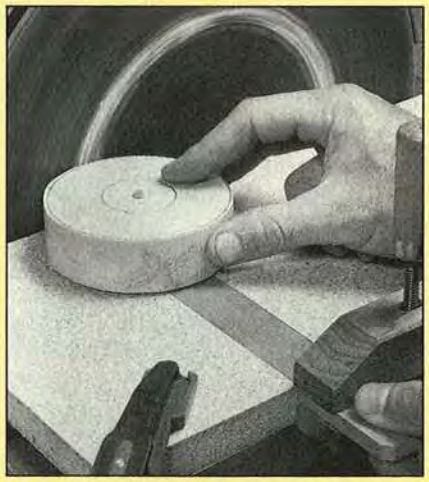
Continued

BUILD YOURSELF A SET OF MONSTER TIRES

For heavy-haulin' vehicles such as the dump truck shown opposite, or the monster pickup truck on page 46, you just can't top these big wheels. And, after you build the two simple jigs required, you can turn out these wheels lickety-split.

Get the wheel into the round

As you can see by the illustration *below*, this wheel consists of two halves, each cut from 1 1/16" stock. For each wheel, draw two 3 1/2"-diameter circles on the stock. Within one of those circles, use the same centerpoint to draw a 1 3/8" circle. (This will be the outside half of the wheel.) Now, cut out the two wheel halves on your bandsaw, staying just outside the 3 1/2" circles. Then, build the simple sanding jig shown on page 16. Drill a 3/8" hole in the center of both halves and sand the wheels round as shown at *right*. Next, rout a 1/4" round-over around the outside diameter of each wheel on the sides previously marked with a pencil.

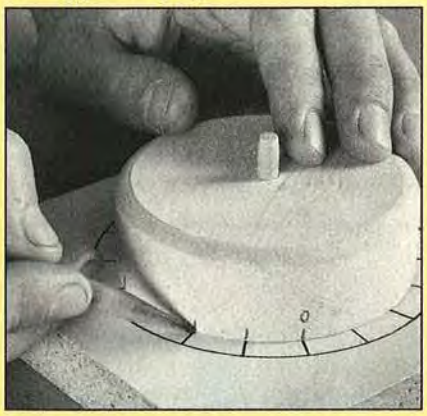


Set the sanding jig's stop for the correct wheel diameter, then turn the wheel into roundness with a disc sander.

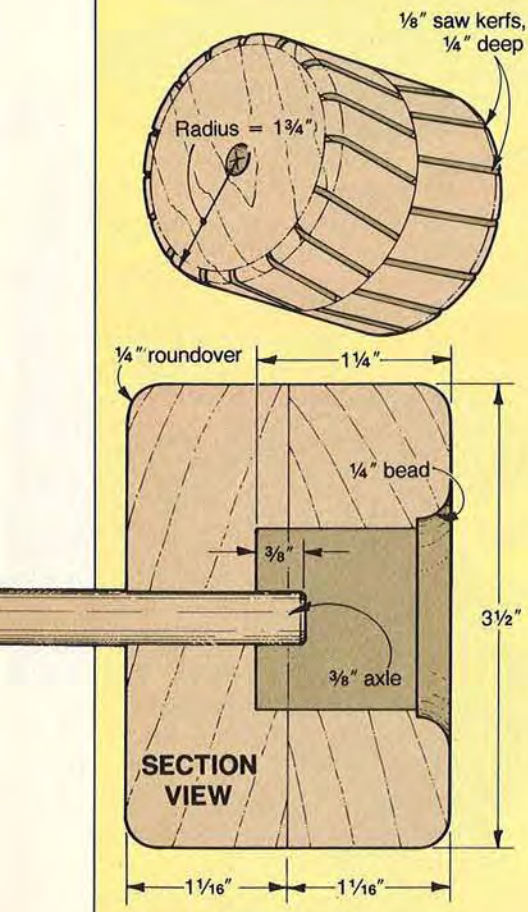
Let's add those earth-hugging treads

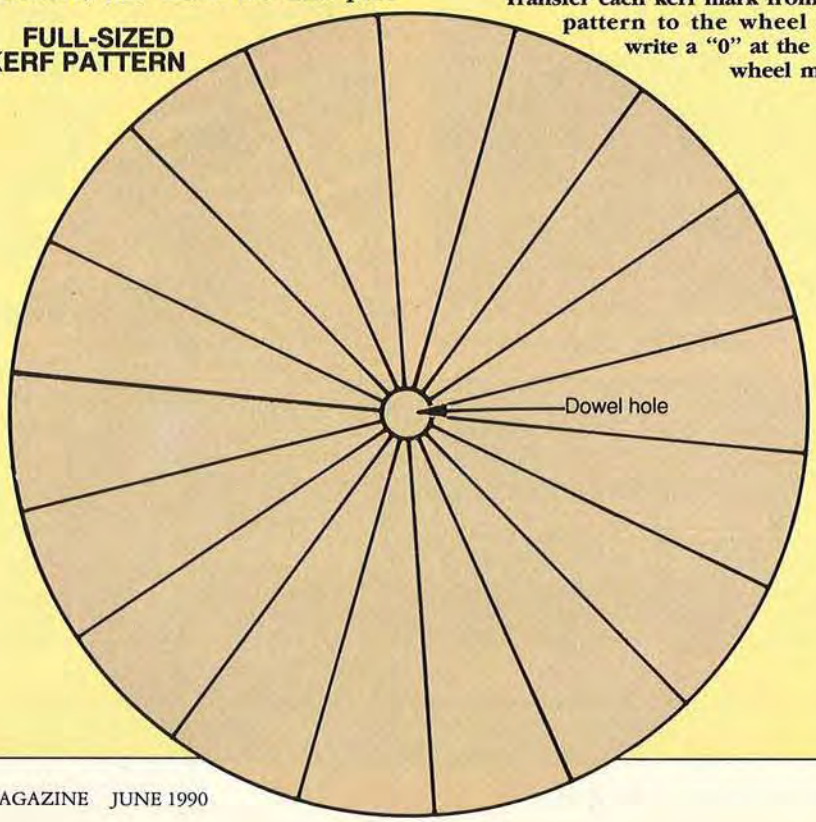
Before you cut the kerfed treads, you need to make a kerf-marking platform by inserting a 2"-long, 3/8" dowel into the center of a 5" × 5" piece of stock. Center the full-sized kerf pattern shown *below* on the platform, and mark the kerf positions on the unrounded edges of each wheel half as shown in the photo *below*. Write "0" above one kerf mark on each wheel half.

To make the angled kerf-cutting jig shown *opposite*, cut a piece of 3/4" plywood to 3 1/2 × 16". Then, center this piece on your miter gauge and attach it with screws. With you miter gauge set at 15° according to the kerf-cutting drawings on the opposite page, cut two saw kerfs through the jig with your miter gauge set to the left and then to the right of the blade. Add 3/8" dowels and reference marks to the jig as indicated in the drawing on the opposite page.

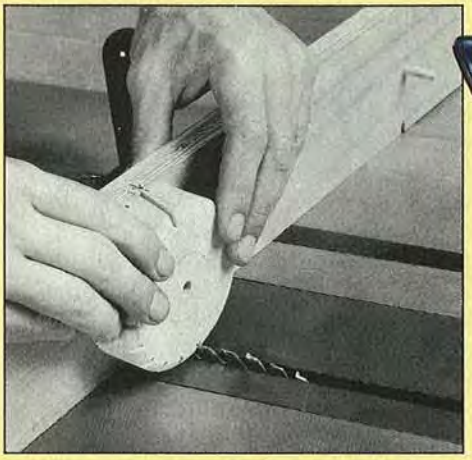


Transfer each kerf mark from the pattern to the wheel and write a "0" at the first wheel mark.





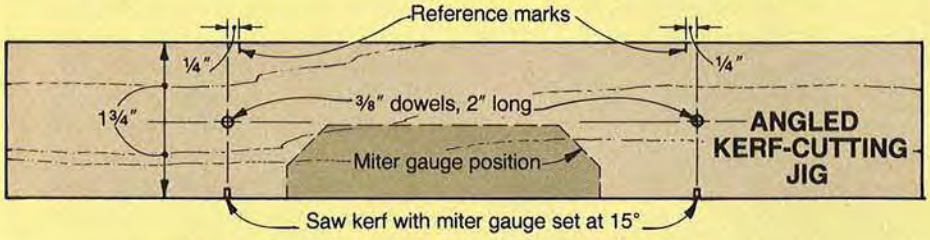
Now, slip each of the wheel halves (unrounded side first) over one of the jig's dowels according to the instructions given on the illustration at *bottom*. Starting with the "0" mark aligned with the jig's reference mark, cut one ¼"-deep kerf after another as shown *below*. Stop making cuts when the "0" goes all the way around the wheel and again reaches the reference mark.

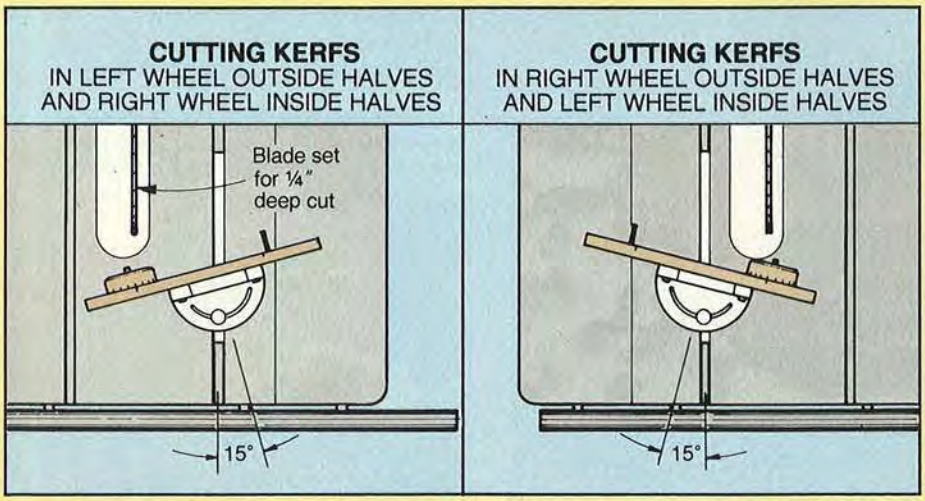


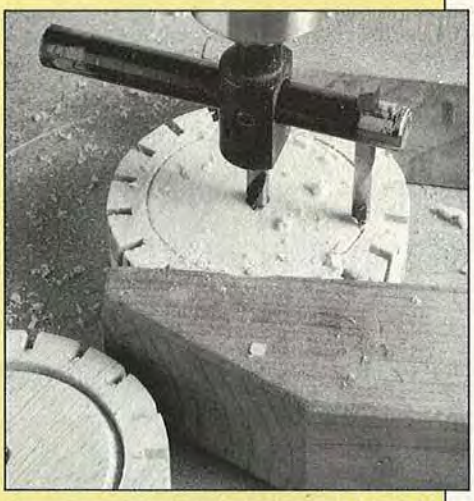
Line up each mark on the wheel with the reference mark on the jig before cutting each kerf.

Now, assemble your wheels

Here's a trick for avoiding glue squeezeout that you can use on other similar projects. Before gluing together the wheels, cut a ⅛"-deep trough just inside the treads on the facing edges of the wheel halves as shown *below*. After applying the glue, place a ⅜" dowel through the two wheel halves for alignment, clamp the halves together, then withdraw the dowel so it doesn't become glued in place. Bore a 1⅜" hole, 1¼" deep into the outside of the wheels where marked previously. Then, add a ¼" bead as shown on the opposite page. That's it—you've created a monster!







Use your circle cutter to make a handy trough for catching glue.

Written by Bill Krier with Jim Downing. Illustrations: Bill Zaun; Mike Harrington; Jim Stevenson. Photographs: Hopkins Assoc.

Print this article

FUN-CHARGED MONSTER

Making vehicles and jigs is nothing new to Edward Dohm of White Cloud, Michigan. A retired Oldsmobile production engineer, he spent less than an hour concocting the jig to kerf the hefty wheels on his monster truck. With a quality project like this, it's easy to see why this retiree enjoys spending more than 30 hours a week in his woodshop. In fact, Ed and his wife, Janice, market their wood projects at more than 10 craft shows a year in western and southern Michigan.

Note: To form the large wheels, refer to our wheel-making techniques article starting on page 44. You'll also need some thin pine for this project. You can either resaw or plane thicker stock to size.

Cut and join the cab and body parts

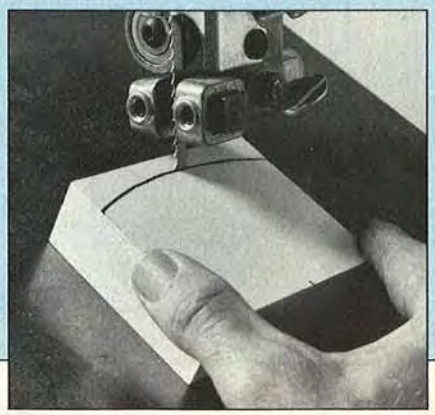
1 Cut the pickup bed (A) to the size listed in the Bill of Materials on page 49. (We planed a piece of ¾"-thick stock to ⅜" thick.)

2 Cut the hood (B) to size. With the front ends and edges flush, glue and clamp the hood to the bed. (When clamping together the pine pieces to make this project, we used clamp blocks to prevent the jaws from denting the soft pine.)

3 Cut a piece of 1 1/16"-thick pine to 2½" wide by 3⅜" long for the cab blank (C). Transfer the full-sized cab bottom-view pattern to the *bottom* surface of the cab blank. Tilt your bandsaw table 30° from horizontal. With the bottom surface of the cab blank facing up, follow the marked line to cut the cab front (windshield) to shape, as photographed *below*.

4 From ⅜" pine stock, cut two pieces 1⅜" wide

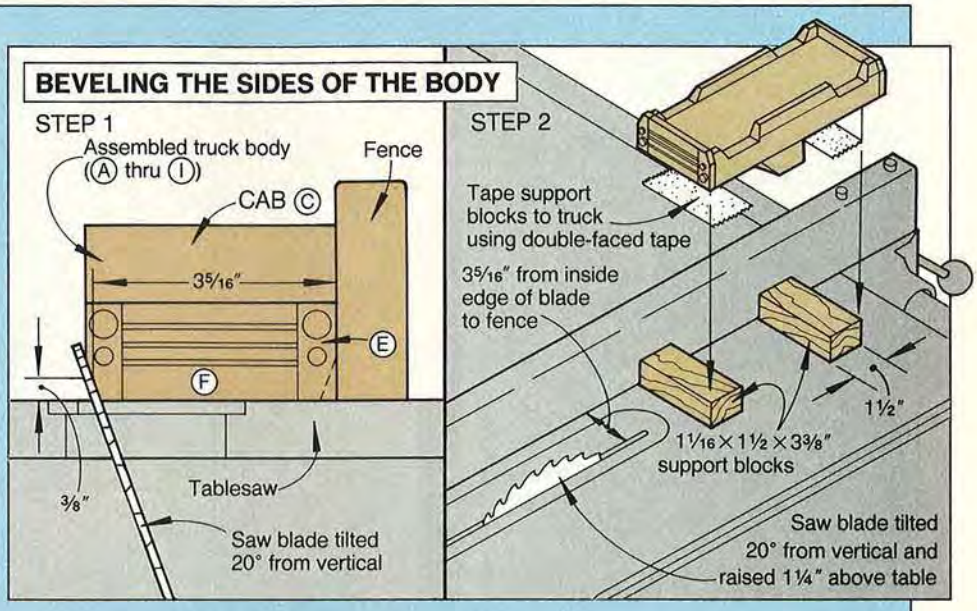
Transfer the pattern to the bottom of the cab blank, angle the bandsaw table, and cut the cab front to shape.



TRUCK AN OFF-THE-ROAD TRAILBLAZER

by 7¾" long for the fenders (D). Using double-faced tape, stick together the two pieces, with the edges and ends flush. Now, transfer the full-sized fender pattern to one of the pieces. Cut the wheel openings to shape. Splash a bit of lacquer thinner on the taped joint, and pry apart the pieces (we used a wooden wedge, because a screwdriver tends to dent the pine).

5 Glue and clamp the fenders (D) to the bed-hood assembly (A, B), with the top edges and ends flush. See the Body Assembly Drawing for reference. With the back edge of the cab (C) flush with the back edge of the hood (B), glue and clamp the cab to the hood.



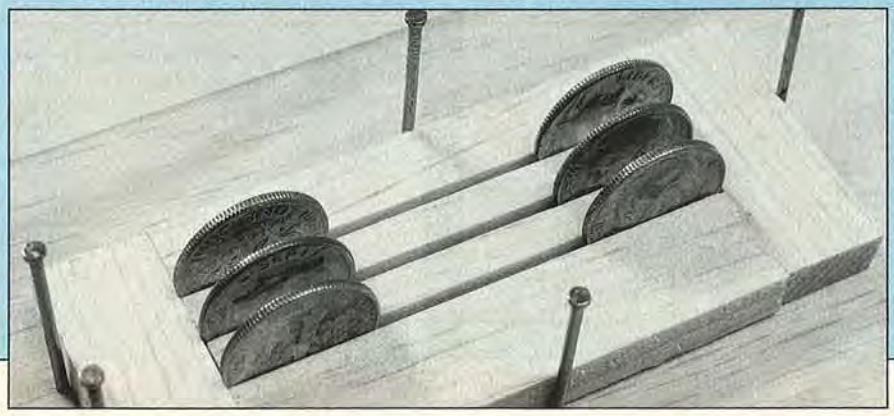
Here's an easy way to assemble the grille

1 Cut the grille parts (E, F, G, H) to the sizes listed in the Bill of Materials from ¼" pine stock.

2 Tape a piece of waxed paper onto a piece of flat stock. (The waxed paper keeps the grille parts from sticking to the substrate.) Spread glue on the mating surfaces and hold the parts together with nails, spacing the parts with dimes as shown in the photo *below*.

3 After the glue dries, pull the nails and remove the grille from the substrate. Referring to the Parts View Drawing for locations, drill the headlight and parking light holes. Sand both surfaces of the grille. With the top of the grille flush with the top of the hood, glue the grille to the front of the cab assembly.

Hold the grille pieces together with nails. Space the glued pieces apart with dimes until the glue dries.



Tailgate, bumpers, and lights add a flashy look

1 Cut the tailgate (I) and bumpers (J) to size.

2 Cut a 1/32" saw kerf 1/32" deep in the tailgate where shown on the Parts View Drawing. (We used a dovetail saw to cut the kerfs.)

3 With a brad-point bit, drill the holes in the tailgate where shown on the Parts View Drawing. Sand the tailgate smooth.

4 From ¼" and ⅜" dowel stock, cut the headlights, taillights, brake lights, and parking lights for the grille and tailgate to length. Glue the dowels in place.

5 With the top of the tailgate flush with the top of the fenders, glue the tailgate to the truck body.

6 Using the two-step drawing *above* for reference, bevel-rip both sides of the pickup body.

7 Glue and clamp the bumpers to the front and back of the truck.

The wheels and drive-train assembly come next

***Note:** For details on how to make the oversized wheels (M), see the instructions on page 44.*

1 Laminate three pieces of ¾ × 2⅜ × 6½" pine face to face, and cut the axle blocks (K) to shape from the lamination (see the Parts View for the full-sized pattern).

2 Drill a 7/16" hole through each axle block where marked. Cut the axles to 5¼" long from ⅜" dowel.

Continued

MONSTER TRUCK

3 Using the full-sized pattern at *right* as a guide, cut the transfer case (L) to shape and sand smooth. Glue and clamp the transfer case and axle blocks to the bottom of the bed, centered from side to side where shown on the Section View Drawing on the opposite page.

Now, form the spacers and mount the tires

1 Cut a piece of ⅛" pine stock to 2×12" (we resawed thicker stock to ⅛" thick). Using a circle cutter, set to cut a 1" outside diameter, cut the four spacers (N). You could also cut the round spacers on the bandsaw. With a 7/16" bit, enlarge the pilot hole in the center of each spacer. See the spacer on the Parts View Drawing at *right* for reference. (To complement the pine truck, we preferred making our own spacers instead of using ⅜" metal washers.)

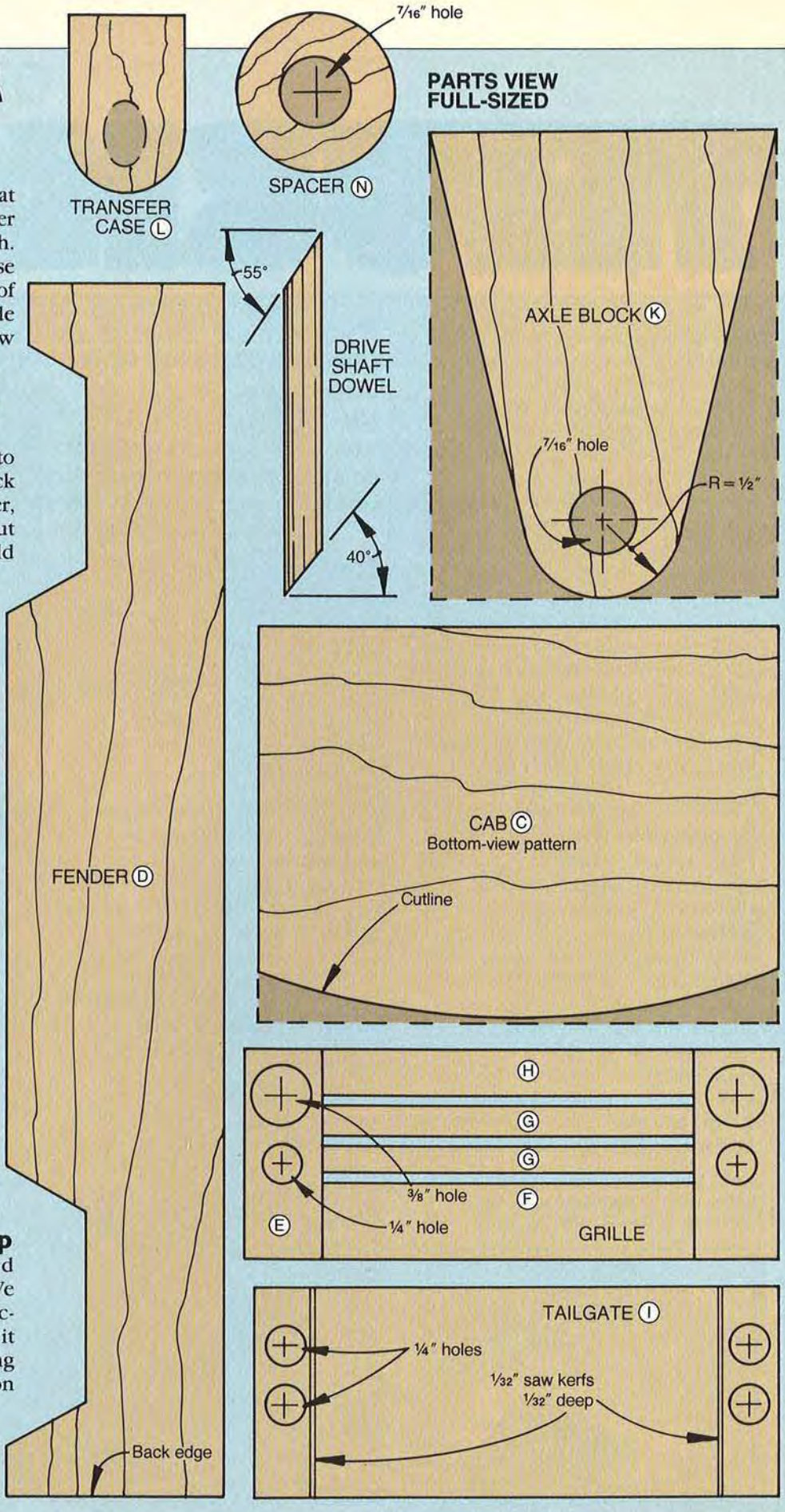
2 Glue an axle to one wheel so ⅜" of the axle protrudes in the counterbore of the wheel. Add a wood spacer onto the axle dowel on the inside face of the wheel. Slide the axle through the axle block, add another spacer, and glue the axle to another wheel. Repeat for the other axle assembly.

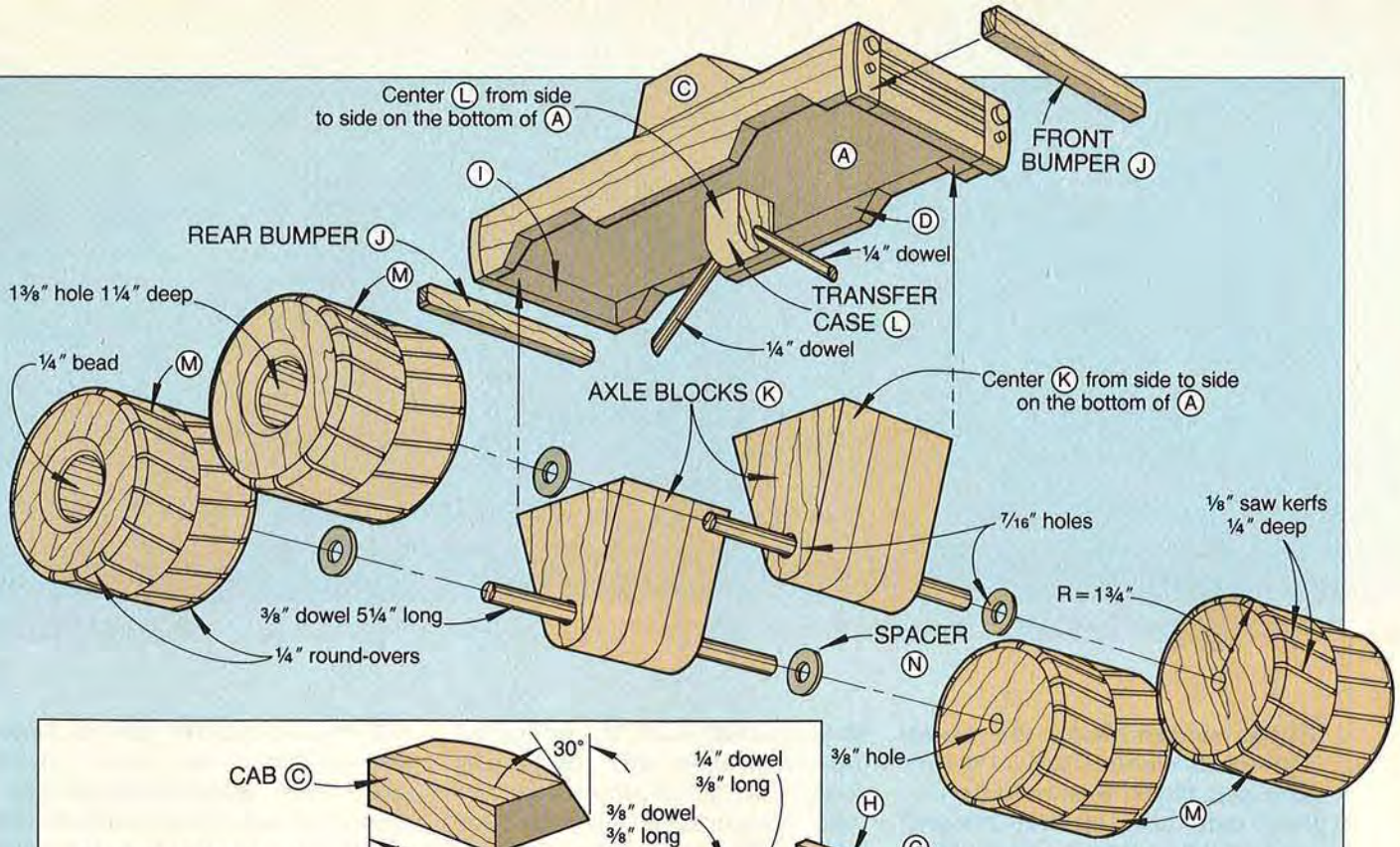
3 From ¼" dowel stock, miter-cut the drive-shaft dowels to the length shown on the Parts View Drawing. Glue pieces in place (we used instant glue). You may need to sand the beveled ends for a gap-free fit between the transfer case and axle blocks.

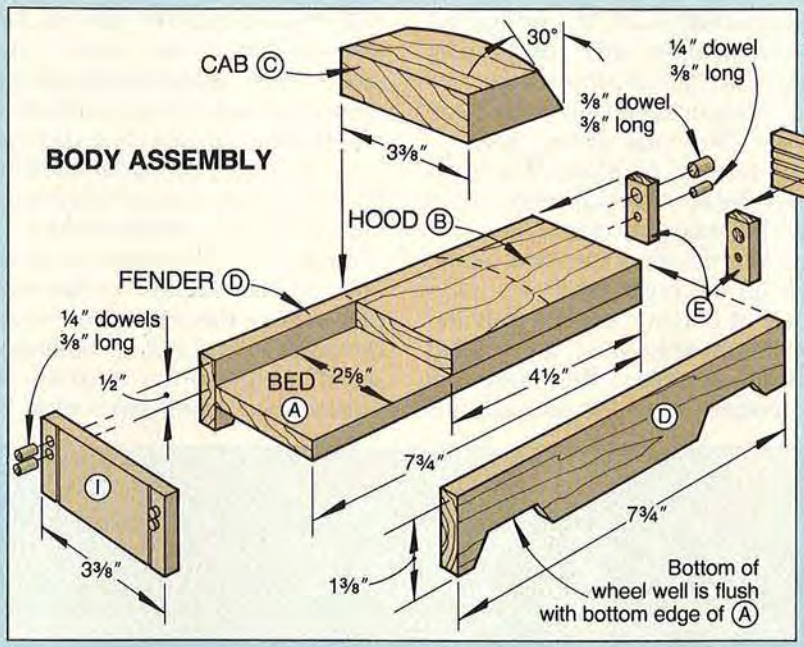
Add the finish and fuel it up

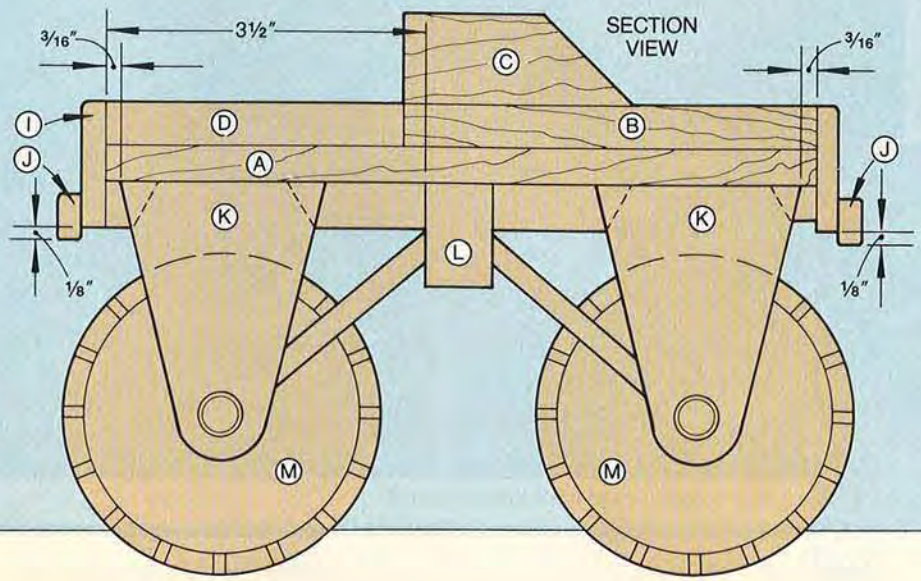
1 Finish-sand the pickup and wheels. Add a clear finish. (We used polyurethane. We do not recommend an oil finish on toys; it tends to "attract" dirt from young hands and the finished project soon looks dirty.)

Produced by Marlen Kemmet
Project Design: J. Edward Dohm
Photographs: Hopkins Associates
Illustrations: Kim Downing; Mike Henry









Bill of Materials

	Part	Finished Size* T	W	L	Matl.	Qty.
A	bed	⅜"	2⅝"	7¾"	P	1
B	hood	½"	2⅝"	4½"	P	1
C*	cab	1 1/16"	2½"	3⅜"	P	1
D	fenders	⅜"	1⅜"	7¾"	P	2
E	grille sides	¼"	½"	1⅜"	P	2
F	grille bottom	¼"	½"	2⅜"	P	1
G	grille centers	¼"	3/16"	2⅜"	P	2
H	grille top	¼"	5/16"	2⅜"	P	1
I	tailgate	¼"	1⅜"	3⅜"	P	1
J	bumpers	¼"	½"	3⅜"	P	2
K*	axle blocks	2¼"	2¼"	3"	LP	2
L	transfer case	¾"	¾"	1⅛"	P	1
M*	wheels	2½"	3½" dia.		LP	4
N*	spacers	⅛"	1" dia.		P	4

*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

Material Key: P-pine, LP-laminated pine

Supplies: double-faced tape, ¼" and ⅜" dowel stock, clear finish.

Print this article

5 EASY STEPS TO A FINISH THAT'S GLASS-SMOOTH

1 For starters, sand the wood surface smooth with 150-grit paper. If you plan to stain the piece, sand it again with 220-grit paper. If you used an orbital sander, be sure to closely inspect the surface under sidelighting and sand away any swirly marks.

Now, carefully remove the sawdust from the surface with compressed air. Otherwise, vacuum the surface and clean it with a tack rag. If you prefer a stained surface, apply an oil-based stain and allow it to dry for 24 hours.

2 Coat the end grain of the surface with polyurethane, and allow it to saturate the pores fully before applying any finish to the tabletop. After a couple of minutes, and 2–4 applications, the end grain will stop absorbing polyurethane. Now, coat the top by brushing the polyurethane *across* the grain as shown *below,* then brush *with* the grain to completely fill the wood pores. If you stained the piece, allow this coat to dry completely before proceeding.

For unstained wood, immediately wipe away the excess polyurethane with a 6–8″ squeegee as shown *below.* The squeegee helps drive the material down into the wood pores, and leaves almost no finish on the high grain.

After the first coat of polyurethane dries (on either the stained or unstained piece), lightly smooth the surface with 150-grit sandpaper, being careful not to sand through the finish of the stained piece. With a fast-drying polyurethane (we used Varathane's Professional Clear Finish), you can apply your second coat after 12 hours. For slower-drying polyurethanes, wait 24 hours between coats.

Apply and squeegee a second coat to the stained or unstained piece. After this coat dries, inspect the surface in a strong sidelight to see if the grain has filled to your satisfaction. If not, sand with 150-

One morning not long ago, Design Editor Jim Downing marched into the *WOOD*® magazine shop carrying a smooth-as-glass tabletop that he had made for the galley of his 30′ sailboat. Not surprisingly, it brought on a chorus of "oohs" and "aahs" as staffers rushed to run their fingers across it. Right away we knew that Jim's polyurethane-finish technique was too good to keep a secret from our faithful readers.

The key supplies for Jim's glass-smooth finish include 1,500-grit sandpaper and two finishing compounds formulated for auto finishes. In case you can't find a local auto-supply dealer that carries these products, we've arranged for a mail-order source. And, you won't need any special tools—just some patience and a little elbow grease.

grit paper and repeat the process. Sand the final coat with 150- and 220-grit papers. For the porous red oak end table in this story, we applied and squeegeed four coats to completely fill the grain.

3 Next, spray a heavy, flowing coat of polyurethane onto the surface. Apply three more coats, and sand between them with 220-grit paper. (Aerosol cans work fine if you don't own a spray gun.)

After the final coat dries, apply a few ounces of water and wet-sand the surface with a 3M No. 20 wet or dry sponge pad and 1,500-grit paper as shown *below left.* Check for glossy spots and resand any missed areas. You can purchase the pad, 1,500-grit paper, and finishing compounds through the Buying Guide *below right.*

4 Build that glowing finish with 3M's Finesse-it II Finishing Material. Squirt an ounce or two of the liquid onto the surface and rub it in with a clean, soft rag as shown *below left.* Bear down hard as you rub the entire surface. Then, wipe the surface clean, and if you see any dull areas that you missed, redo them.

5 For the final luster, repeat Step 4 with 3M's Imperial Hand Glaze. Be careful to use separate, clean rags for steps 4 and 5.

From beginning to end, we spent five days finishing the end table's oak surface. Less-porous woods, such as cherry, maple, or walnut, require about half that much time.

Buying Guide

- **Glass-smooth finishing kit.** Quart-size bottles of 3M Finesse-it II Finishing Material and Imperial Hand Glaze, 50 sheets of 1,500-grit sandpaper, and No. 20 wet or dry sponge pad, $44.62 (U.S.) ppd. Hawkeye Auto Supply, 417 12th St., Des Moines, IA 50309.

Written by Bill Krier with James R. Downing Photographs: John Hetherington; Hopkins Associates

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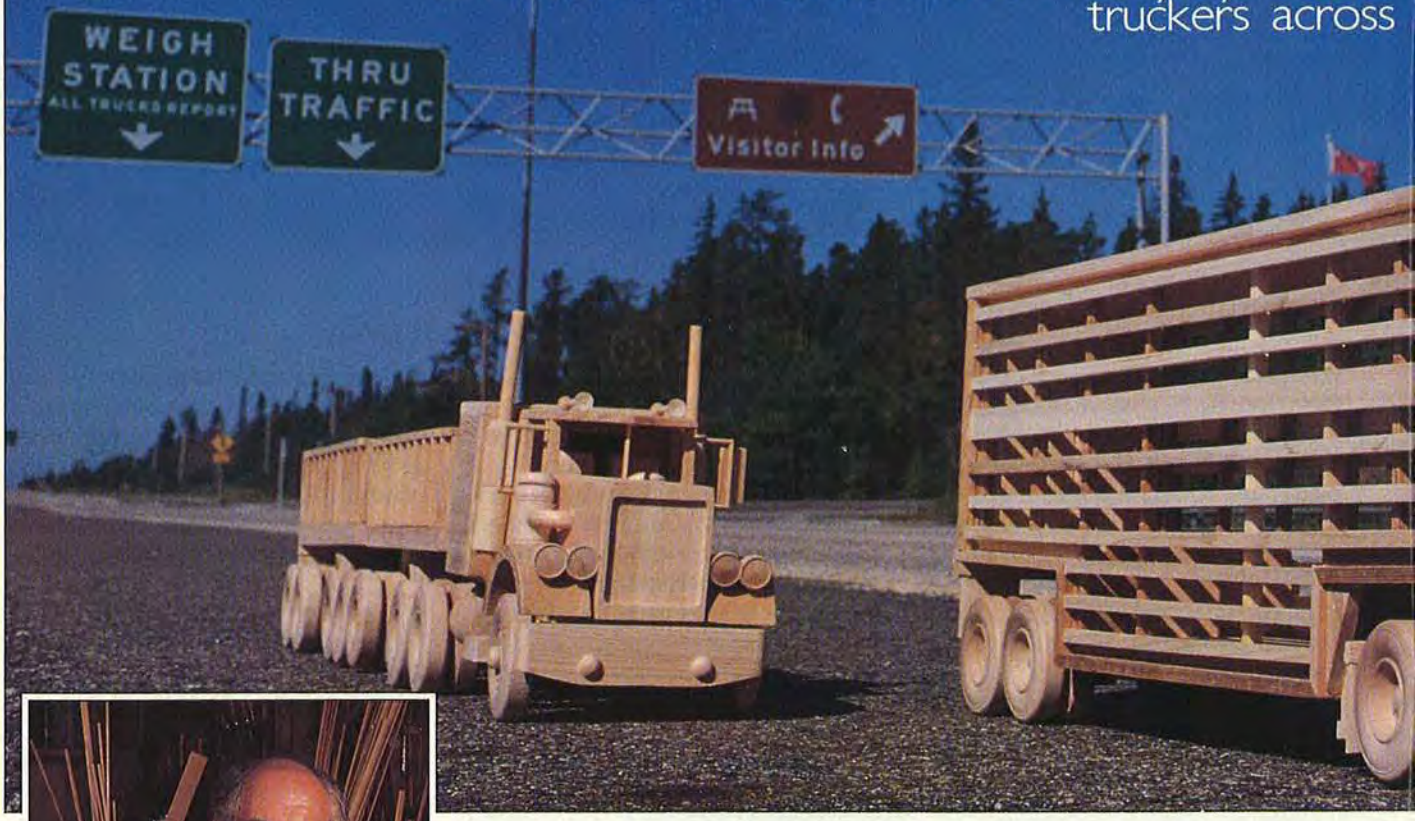
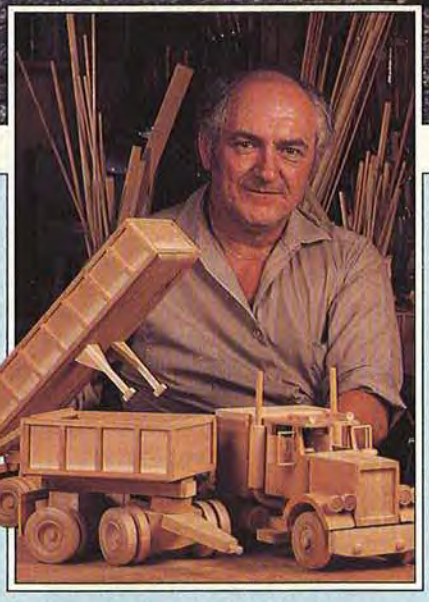
TOYS FOR

Canadian woodworker Karol Fedoryshyn crafts truckers across





Karol Fedoryshyn

When Phil Vander Ploeg, president of Toys and Joys in Lynden, Washington, mentioned that he knew a man in Manitoba who made lots of neat trucks, we checked out his tip. Sure enough, Phil, one of our 1989 Design-A-Toy judges, recognizes a craftsman when he sees one.

At East Braintree, in eastern Manitoba, we found Karol (say Carl) Fedoryshyn at work on his model trucks. He and his wife, Mabel, made us feel at home.

Karol also took us to the weigh station where he's employed so we could see firsthand how he does his research. There, we met several swell Canadians who make their living on the open road. And, after watching us photograph some of Karol's trucks, the drivers even placed orders for their own models.

Trans-Canada Highway 1 spans 2,500 kilometers from its oceanside beginning at Vancouver, British Columbia, to its dilution into several routes near lake-dotted Kenora, Ontario. To truckers, names like Kamloops, Medicine Hat, Moose Jaw, and Portage-la-Prairie become landmarks on a cross-country road that slices through soaring mountains, flat grain fields, and dense timberland.

Long-haul drivers know every inch of Trans-Canada 1—particularly the weigh stations at provincial borders. To weight or safety violators, these mandatory stops can represent delays, fines, hassles. Most truckers, though, look on them as oases on the long, paved ribbon.

BIG BOYS

custom cedar semis for the provinces.

Manitoba's West Hawk scales, at the Ontario border, has an added attraction. To hundreds of Canadian truckers, it's where "the model guy works."

Fords, Freightliners, Macks, Petes, Whites, and wolves

Karol Fedoryshyn has worked at the West Hawk scales long enough to have seniority, and learn a lot about semis. He studies them for his job, and for the models he knows he'll eventually build. Since he began building them five years ago, Karol has made at least 400 truckers happy with 1/12-scale copies of their rigs. His models sell for about $200 (Canadian) and have found their way to England, New Zealand, Ireland, East Germany, as well as the States.

Karol has made small and big trucks—one rig had 52 wheels and stretched 5'7". No matter the size, though, count on realism.

"That's a Ford L9000," Karol says after glancing at a truck just coming onto the off ramp. "Fords, Freightliners, Macks, Peterbuilts—the radiator gives them away," he notes from his desk.

With a twinkle in his eye to rival St. Nick's, Karol mentions the basic truck body styles of cabover and sleeper, then spells out how each manufacturer adds distinctive features. With knowledge that goes below the surface, he doesn't hesitate to explain tridem axles and engines to boot.

Karol notes the nuances from truck to truck because he has to.

▲ Near the West Hawk scales, a cabover Freightliner hauling livestock parks behind Karol's 1/12-scale version.

"My models must be accurate," he explains. "Two truckers may each own the same tractor, but they'll never be exactly alike. They customize them, eh.

"So, when someone wants me to make a model of his tractor, he'll point out what he's added," Karol continues. "Then, I take a photograph that shows all the details, and build from that."

Studying trucks has become as second nature to this craftsman as watching for wildlife has to long-haul drivers on Canadian highways. During his shifts at the scales, Karol scans each semi as it's weighed and thinks about

Continued

how he can copy some aspect of it in wood. "Sometimes, I get an idea for a new way to make a part," he notes. "Like where the exhaust stacks curve to go beneath the cab body. I used to make them from dowels that I bent with a series of cuts, then glued. But they never looked quite right. Then, I thought of wooden drapery rings. A cut-off section of the radius worked perfectly. That's what I went to."

Closely observing trucks at the scales has brought some surprises, too. Such as the time Karol spotted the wolf.

"We're so far out in the bush," he says in setting the scene, "it's not unusual to see a bear or a moose amble down the highway. But, one winter night, I was watching a driver walk around his truck to thunk tires—and there was a timber wolf following him! Just interested, you know, in what the man was doing. The trucker, he didn't see him, eh. Just kept walking. He wouldn't believe it happened."

Eighteen wheelers at 40 degrees below

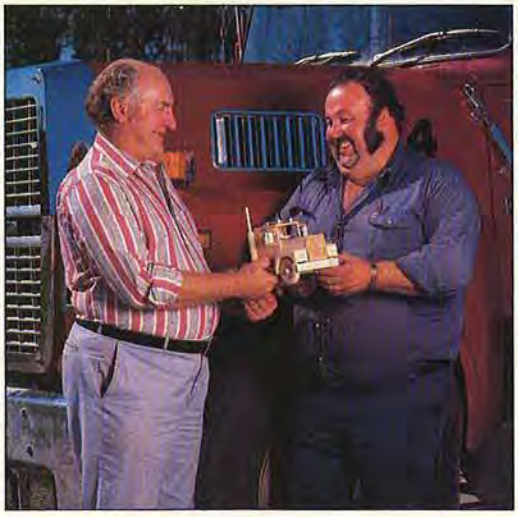
Around sparsely settled Falcon Lake, box numbers replace house numbers. And, after years spent in bustling Winnipeg, Karol likes the solitude of his 20-acre parcel adjoining the Boggy River. Even the double-garage-turned-shop touches the woods.

"Here's where I block my wood to size," Karol explains as he opens the overhead door. In the walkways between the racks and stacks of stored wood stand some dusty stationary machines. "I started 10 years ago with a used jointer and a 10" tablesaw. But, the planer I got has turned out to be a godsend. Before, I had to do a lot of sanding to get the wood to the proper thickness after resawing. Now, I send it through the planer and it comes out exactly ¼" or whatever I want."

Karol pauses, surveys his machines, then reflects, "My Dad bought me my first saw when I was six. He was a butcher by trade, but he learned woodworking in the Old Country—Czechoslovakia—where they built a workbench or other projects without any fasteners. He'd use pegs and slotted joints. No power tools. I learned a lot from him."

Karol continues the train of thought. "In high school, my wood shop teacher, Mr. Burnside, made us do everything with hand tools the first year. We called him 'Face-Side and Face-Edge Burnside' because he'd give us a rough piece of lumber and we'd have to plane the face side of it flat. Then, he'd check it with a square, and the face edge had to be exactly 90°. If it wasn't right, you had to scrap it and start over again. A lot of kids now," he says, tugging at an ear, "they're lost without an electric power tool and an extension cord."

Karol walks over to a door in the dividing wall and opens it to reveal a second shop. "This room is where I do all the parts-sawing, sanding, and assembly. It's insulated to 40° below," he says proudly. The assembly shop isn't filled with bank after bank of stationary power tools, only the necessities.



Karol, for the most part, makes do with what he has. "That tablesaw is 30 years old. I bought it at Sears," he explains. "It's a 'National' and it has a 4" jointer. With the stand, motor and everything, it cost $125. I remodeled the fence, though, and rebuilt the arbor."

Left top: Karol makes cars for gift shops, although he sells the trucks, such as the sleeper he's inspecting, by special order.

Right top: Karol trims up cab detail. Note the materials: the golf-tee air horns and drapery-ring sections for exhaust pipe.

Right bottom: From maple, Karol turns inner wheels for his semis ten at a time. He buys outer wheels by mail order.

Left bottom: " 'Bout time I got it, eh?" says jovial trucker Gerald Michaud of St. Pierre, Manitoba, as he takes delivery of his model Ford LT9000. Karol personalizes his models by photographing each rig, then adding details from the photo.

Karol does all his resawing on the little bench-type saw. He makes crosscuts on the radial-arm saw—when its table isn't littered with sketches and plans. "That's where I do all my drawings," he says, clearing away the jumble of rolled and folded papers.

Production for the parts bins

Karol hasn't yet made all the rigs he sees go through the scales. But he's made enough to know that there's lots of identical parts on the road. That means inventory.

"Cutting the parts and assembling the trucks take about equal time," Karol notes. "I'd say I average about 10 hours per truck. And that's because I try to save time where I can."

For instance, Karol buys ready-made hardwood wheels by mail order. The inside wheels that don't show, he turns in his shop from maple. "I just chuck a long square on the lathe, turn it round, define each wheel, and cut them apart," he says. (See photo, *left.*)

"I use the router for the radiators," Karol adds. "When I turn out the radiators [grills], I do them 50 at a time, with templates. I cut the rough block out twice as thick as the radiator will be and press it into the template that acts as a router guide. After I rout out the grill area on one side, I turn the block around and do the other. Then I cut it into two radiators, leave them rough, and stack them in my parts bin. When I make a vehicle, I sand them."

An inspection of Karol's parts department reveals carefully separated containers full of unfinished golf tees for air horns, hardwood plugs and buttons for head- and taillights, dowels and wooden drapery rings for exhaust pipes, turned barrels for tanks, and stack after stack of thin-sawed material for mudflaps, mirrors, and trailer sides. The crowded bins with their labels identifying model designations present a factorylike appearance to one wall of the shop. Everywhere else, there's wood.

Apparently, the near-wilderness setting develops resourcefulness because Karol admits he not only doesn't throw away much wood, he acquires it as inexpensively as possible. "I only use white cedar for my models," Karol says, "and it's expensive. The last time I bought some, in Kenora, it was $1,300 a thousand [board feet]. Some people around here seem to waste a lot of wood, maybe because it's so plentiful."

Trips to the landfill, for instance, prove profitable for Karol. "The contractors who build lake cottages, if they make a mistake, they tear the new stuff out and go to the dump with it," he says.

Trucks for display, not play

Trucks represent the bulk of Karol's production, but he also makes old-fashioned, stake-side pickup trucks, sedans, and other vehicles. A few years ago, he even made a replica of Winnipeg's *Paddle Wheel Queen*, a boat that took 1,000 pieces of cedar to complete.

For the occasional model he builds of hardwood, Karol assembles with yellow glue. The white cedar pieces for most of his vehicles, though, go together with a hot-glue gun. "It's fast, not messy, and it holds up," Karol says. "I've only had to repair one. The man said it fell off the mantle, but I suspect it had a rough go."

Karol's also a bit unconventional about finishing. He refuses to.

"We seem to be at a time now when people prefer natural wood," Karol says. "I had a guy who showed me pictures of plastic model trucks his son made. He said, 'I want you to make me one out of wood. They're totally different.' The wood seems to bring something out in the truck. If I even put a clear finish on it, I lose all that. Besides, they may be big boys' toys, but they end up on display."

To contact Karol, write:
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Written by Peter J. Stephano
Photographs: Brian Gould/Image 2

THE WONDERFUL WOOD

At Florida's Walt Disney World, the show must go on, and to a select group of craftsmen, that means living a fantasy.

Print this article

The Magic Kingdom. Epcot Center. Disney-MGM Studios. It's all Walt Disney World. And, without a doubt, it's really a world apart.

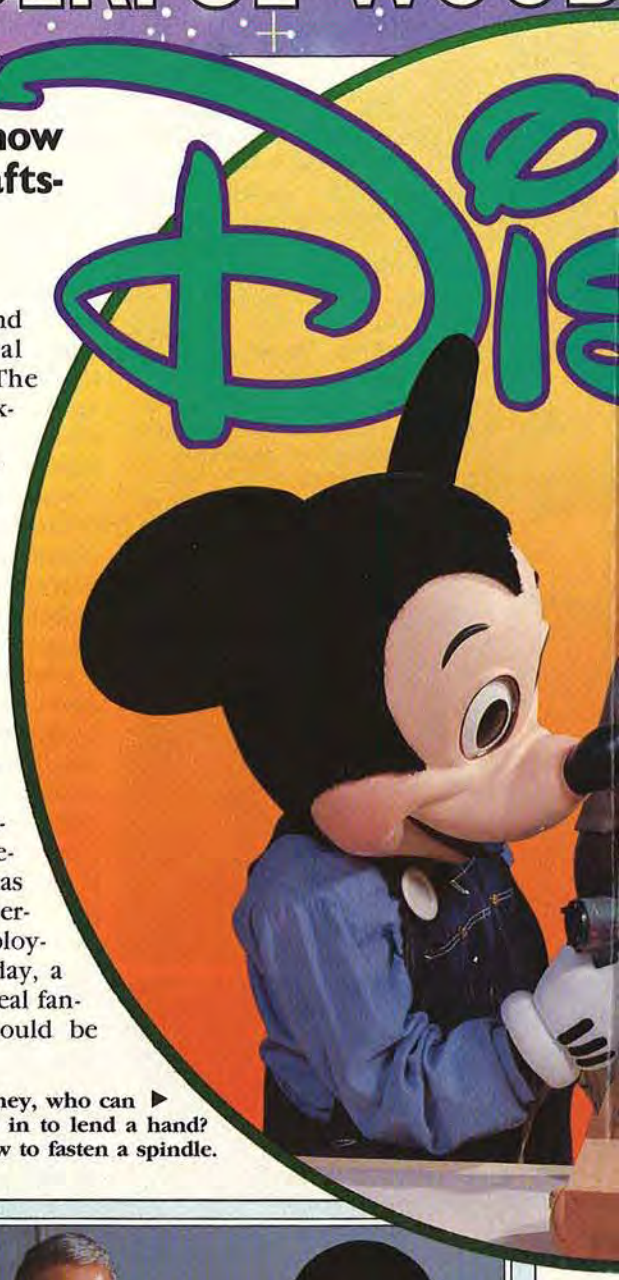
Sprawling across 27,000 acres—that's 43 square miles—Walt Disney World covers a land mass about twice as big as New York's Manhattan Island. For population, would you believe 31,000 employees, a number surpassing many Chicago-area suburbs? And, guess what? Just as in any place with that many people, there are a goodly number of woodworkers, too.

Hi ho, hi ho, it's off to work we go

Behind the characters, castles, exhibits, glitter, parades, restaurants, rides, and thrills that the Disney corporation created in central Florida's piney woods, we found some hardworking craftsmen. Even a hot summer sun, humidity, or a blustery day can't dim the enthusiasm of the 40-man crew that makes up Walt Disney World's mill shop. Above the din of saws and shapers, there's occasional laughter. And why not? The Disney brand of woodworking happens to be fun.

Where else but at Disney World could a woodworker—in a week—carve a car from Styrofoam, mend Cinderella's carriage and castle, cut out 300 plywood palm leaves, repair a century-old carousel horse, and craft cabinetry for a foreign exhibition? At Disney World, these tasks are a matter of course.

"We're not really a production shop, we're a specialty shop," explains Cephas Goodman, 56, mill shop superintendent and a Disney employee for two decades. "One day, a worker could be making a real fancy cabinet, the next he could be making a crate."



In the Wonderful World of Disney, who can tell when the boss might drop in to lend a hand? Mickey shows Carlos Boero how to fasten a spindle. ▶

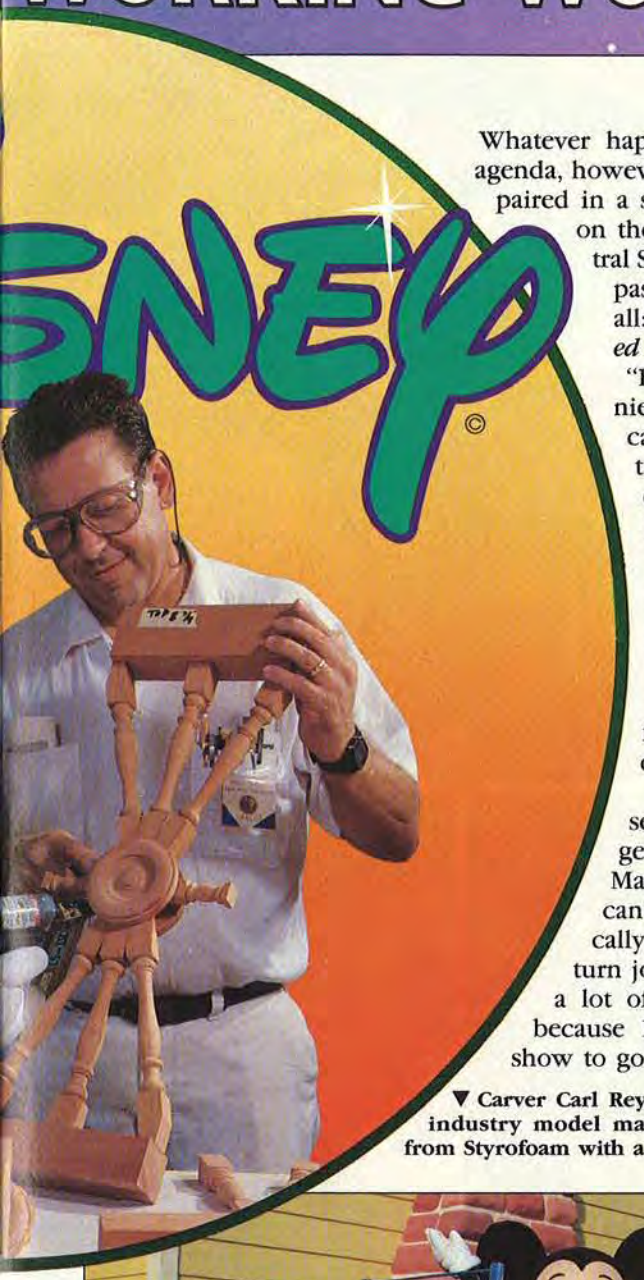
WOOD® ON THE ROAD

Did you know that Mickey Mouse likes woodworking, too? And, boy, does he ever have a great shop with lots of tools!

Last August I got to see first-hand what it's like to be a behind-the-scenes woodworker at Walt Disney World. For the better part of two days, I met and talked with the craftsmen you'll meet in this article and their fellow workers. I saw their work, too, and from cabinetry to stage sets, it's all first class. And you know what? I can't recall a happier bunch. Maybe it's because they know their work makes others happy. Thanks for the experience, Mickey and friends.

—Peter J. Stephano, Features editor

WORKING WORLD OF ...



Whatever happens to be on the daily agenda, however, it won't be made or repaired in a slipshod manner. The sign on the side of the massive Central Shops building that encompasses the mill shop says it all: *CENTRAL SHOPS, Dedicated to Excellence.*

"Big manufacturing companies and even cabinet shops can't afford to take the time to do things like Disney does," says Cephas. "Like building Mickey Mouse's car for Mickey's Birthday Land. Carl Reynolds (see photo *below*) probably spent four weeks on it, besides his other work. He carved it out of foam from nothing but a rough-drawn sketch."

Then again, Cephas often sees to it that some things get done quickly. For unlike Mary Poppins, Cephas' crew can't get the work done magically. "Sometimes, we have to turn jobs around pretty fast, and a lot of work becomes overtime because Disney always wants the show to go on."

▼ Carver Carl Reynolds, a former Detroit auto-industry model maker, fashioned Mickey's car from Styrofoam with a chainsaw and a bread knife.

A workshop fantasia

Walt Disney World's Central Shops covers 180,000 square feet—that's about four football fields—and serves the entire Disney empire. From within its walls emerge everything from paddlewheelers to mechanical animals, destined not only for the Florida kingdom, but California's Disneyland, the theme park outside Tokyo, the facility under construction near Paris, and even non-Disney enterprises. "For example, we built a dozen small ride boats for a Hyatt hotel in Hawaii," Cephas points out.

As part of Central Shops, Cephas Goodman's mill shop claims a floor area equal to 48 double-car garages (23,000 square feet). And, that gigantic shop houses a host of equipment: seven jointers, nine radial-arm saws, nine 10″ tablesaws, seven bandsaws, a huge resawing bandsaw, a straight-line ripsaw, three planers, a profile sander, an overhead router, an inverted router with vacuum template, five shapers, a pair of doweling machines, four chop saws, eight disc sanders, five spindle sanders, a 6′-bed lathe, and a huge lathe with a 27′ bed. And probably 101 hammers.

The mill shop even has an in-house millwright, Bobby Fultz. What does a millwright do? Sharpen blades, weld bandsaw blades from roll stock, and create special blades—such as the 700 shaper knives with profiles unique to Disney World—on a $20,000 profile knife grinder.

With all those woodworkers working and tools machining, Cephus' crew naturally goes through a lot of wood, even in a week. That's why the lumberyard across the way carries enough stock to service a small city.

Wood by the train-car load

Tiki Parks, the mill shop's planned-work specialist, tracks the running inventory of wood in the lumberyard. Her daily tallying indicates

Continued

that more than several train-car loads pass through the shop each year. "The lumber warehouse, in an average year, issues 39,000 board feet of South American mahogany, 12,000 board feet of hard maple, about 49,000 board feet of select, structural, vertical-grain Douglas fir, 261,000 board feet of construction-grade spruce, 125,000 board feet of pressure-treated pine, 11,000 board feet of oak, and a mixture of others—cherry, poplar, cedar," she says after a quick glance at her computer. "Then, there's the plywood. Fir plywood alone runs over 16,000 sheets. And, we special-order other woods as needed."

To most *WOOD* magazine readers, that's more than a cat's nine live's worth of stock. Where does it all go? "Mahogany and vertical-grain Douglas fir hold up the best for outdoor moldings, doors, trim, and the like," says Cephas. "In California, redwood held up beautifully when they built Disneyland, and we used a lot of it here when we originally built the park. But, in this damp climate it didn't last, so we don't use any redwood at all now. And, mahogany here costs about the same as vertical-grain fir, and," he adds, "they're both cheaper than pine. We use maple inside for turnings for stair rails and balusters, and it's good to paint. Mahogany also goes into cabinets."

Pressure-treated southern pine ends up as Disney World fences and decking. "For decking, " Cephas notes, "we use only 2-by or 3-by stock, dovetail it every inch, then put a Carborundum material in the grooves to hold up to traffic. Otherwise, the planks would wear out too soon and we'd have safety problems."

Plywood sheets become the material for stage floors, backdrops, and props, such as the palm trees that will eventually decorate the

Top: **Woodworkers build a plywood-and-steel frame for a 54×46′ shell that will adorn the Dolphin and Swan Hotel.**

Bottom left: **Harold Headlee turns everything from stair balusters to 27′ pillars. Note his handy tool rack on the lathe.**

Center top: **Roberto Marrero cuts out plywood signs in the shape of mouse ears with an inverted router.**

Center bottom: Cephas Goodman, on step, and assistant Mark Hilton inspect Cinderella's carriage for damage.

Bottom right: A Disney woodworker, Rafael Mejias, repairs a joint on a carousel horse with a mortise and tenon.

entrance hall of Disney World's brand-spanking-new Dolphin and Swan Resort Hotel. In other construction at that facility, mill-shop employees constructed a 54×46′ scallop shell with ribbing made from 400 sheets of ¾″ plywood, steel framing, and a fiberglass covering (see photo, *left*). Complete, it weighs 75,000 pounds. Held in place at the hotel entrance by a trio of fiberglass dolphins, it will serve as the basin for a massive cascading fountain that visitors drive their cars beneath.

Only experienced woodworkers need apply

Cephas attempts to hire only people who have worked in cabinet or millwork shops, or have extensive home-building experience. "A lot of people have worked in different shops, but we find that no one has ever worked in a shop like Disney's," he notes. "We do things here that you just don't do in other places."

The superintendent spent nearly 20 years as a cabinetmaker in northern Florida before migrating to Orlando and the magic of Disney World. And his employees can cite similar backgrounds. Carlos Boreo, 40, one of Cephas' foremen, grew up in Argentina where he began his woodworking as a young teen with a Cinderella job sweeping out a cabinet shop. Carl Reynolds, the in-house carver, claims 30 years of his 50 in woodworking, including a fun stint making model cars in Detroit. There's also a craftsman who once focused his skills on piano-making; a young man who previously customized private airplane cabins with cabinetry; and a former U.S. Navy submariner who picked up skills in his spare time at base woodshops. Throughout the mill shop runs the common thread of woodworking experience, and for Cephas and Disney World, it pays off in big dividends.

Job tickets from scratch

"We do a little bit of everything," explains Cephas. "I don't really keep track of the categories, but a lot is maintenance—maybe 60 percent—such as repairing doors or cabinets, or even carousel horses. New work might be 40 percent. It's really hard to break down, it varies so much." Vary it does, and that's why Carl, the carver, loves it.

One goofy week, he carved Mickey's car from Styrofoam—complete with dashboard, steering wheel, and seat. The next week he blocked out intricate signs in oak with palm gouges. "There's no pressure, and there's always plenty of time allowed to do the job from start to completion," says Carl.

And, when a project starts from scratch, the woodworker making it follows it through. "When I carve a sign in relief," Carl notes, "I select the wood, cut it, and surface it, too. The only thing we don't do is finishing. For that, it goes down the line to the paint department."

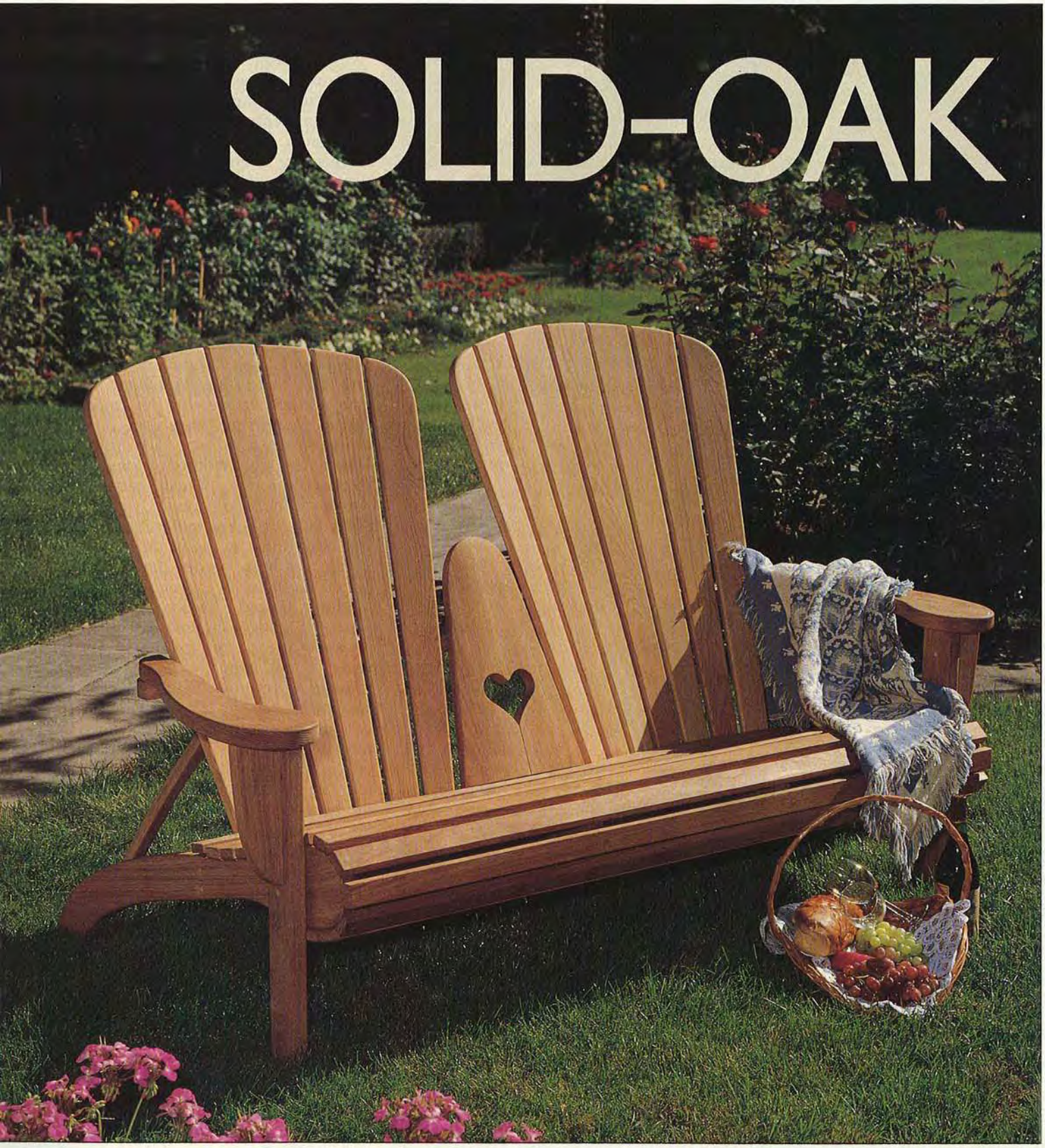
Turner Harold Headlee, 56, has worn the Magic Kingdom patch on his snow-white shirt for nearly 10 years. At his lathe, he shapes the spindles for railings, ship's wheels, and chairs. On the 27′-bed lathe—yes, longer than most garages—he's turned masts for sailing ships and pillars for plantations. "The most fun I've had, though, was turning the balusters for the front porch on Mickey's house. They were made of Styrofoam, like his car!"

Carousel horses, carriages, cabinets, doors, displays, parade floats, paddlewheelers, signs, spindles, ship's wheels, and trams to move people, they're all on the job tickets at Walt Disney World, a woodworker's fantasyland. In fact, Cephas and his craftsmen will attempt practically anything. "Except," says the head man with a sigh, "wagon wheels. We found out it's cheaper to buy them."

Note: Back-lot tours of Walt Disney World are not available to the general public.

Written by Peter J. Stephano Photographs: Bob Hawks Design by C.L. Gatzke

SOLID-OAK



SETTEE

Print this article

Last summer when I was doing some rough drawings for an outdoor settee, I opened an envelope sent in by Luis Elizondo, a reader from Houston, Texas. I was so impressed with Luis's settee design, I suggested we present his project. And am I ever pleased with the results. Since then, we've built two settees to verify the full-sized patterns, dimensions, and joinery, and they've both turned out beautifully. Come on, dive into this project—you'll be glad you did.

Design Editor

Note: For your convenience, we've listed a source in the Buying Guide for full-sized patterns for the settee. Or, if you just can't wait to get started, enlarge the gridded patterns shown on pages 64 and 65. Our cost for this project, including the white oak, stainless-steel screws, and finish, totaled less than $175.

Enlarge the patterns and make the templates

1 To enlarge the gridded patterns, draw 1" grids on large pieces of paper to match the 13 patterns on pages 64 and 65. Using the gridded patterns as guides, lay out the shape of parts on the gridded paper. To do this, mark the points where the pattern outline crosses each grid line. Draw lines to connect the points. Now, mark the screw-hole centerpoints and reference lines on each pattern.

2 Coat the back face of each pattern with spray-on adhesive. With a helper, start at one end and work to the other, laying the patterns flat onto ⅛" or ¼" hardboard. Keep the patterns as flat as possible and be sure to flatten any air bubbles.

3 Bandsaw each template to shape, cutting just *outside* the marked line. Then, sand to the line for the finished shape. Don't forget to bandsaw the notches in the center-support templates (E).

4 Drill ⅛" holes through the templates at each marked centerpoint.

5 Position the templates (except for part P) and trace their outlines and hole centerpoints onto the stock. See the Cutting Diagram for reference and layout.

Machine the parts and construct the seat frame

1 Cut the seat rails (A, B) and legs (C) to the sizes listed in the Bill of Materials on page 63.

2 Bandsaw the end supports (D), center supports (E), and armrest supports (F) to the shape traced from the templates.

3 Cut the notches in the front rail (B) where shown on the Seat Frame Drawing. (We cut ours on the radial-arm saw.)

4 Rout a ¼" round-over along the edges of the pieces where shown on the Seat Frame Drawing on the next page. Do not round over the seat rails (A, B), center supports (E), or the top ends of the leg parts (C, F). Sand the seat-frame members (A through F) smooth.

5 Clamp together the seat members (A, B, E), checking for square. Drill and counterbore the mounting holes, and fasten the parts together with stainless-steel or galvanized deck screws.

6 Using bar clamps, clamp the end supports (D) to the seat assembly (A, B, E). Drill the counterbores (holes for the plugs) in the end supports where marked. Then, drill a ⅛" pilot hole through the middle of the counterbore and 1¾" into the ends of the seat rails (A, B). Now, enlarge the pilot holes in the end supports to 3/16" to form shank holes for the screws. See the Screw Hole Detail accompanying the Seat Frame Drawing for reference. Fasten the end supports to the rails.

How we chose the wood and fasteners for our settee

After weighing the merits of several types of lumber for this project, we selected white oak. Native to the eastern United States and Canada, white oak rates as one of the heaviest, strongest, and hardest of all the oaks. The pores of this species contain tyloses—bubblelike structures that form in the vessels of certain hardwoods and resist liquids from penetrating. This attribute makes white oak a perfect material for liquid containers and barrels, and an excellent candidate for our settee.

If you have trouble locating white oak or you wish to cut costs, you could substitute fir or pine pressure-treated deck material. You'll need to plane the pressure-treated stock to the thickness listed in the Bill of Materials.

What's the best fastener to use in this case? We recommend either stainless-steel or galvanized deck and machine screws. The tannic acid in white oak along with Mother Nature causes ordinary screws to rust and discolor the wood.

Continued

7 Drill the holes, and screw one armrest support (F) to each leg (C). Plug the holes in parts C and D as described in Step 1 *below.*

8 Now, drill the ¼" holes, and fasten each leg to the seat assembly with a stainless-steel ¼ × 2½" machine screw. Set the seat-frame assembly on a flat surface, check that the front legs are square with the floor, and then add the two wood screws to fasten each leg to its mating end support.

Here's how to plug screw-hole counterbores

1 It's necessary to plug the screw-hole counterbores as you go. If you wait until the very end of construction, several of the holes are impossible to get at. To plug the holes, cut ⅜"- and ½"-diameter plugs from oak stock. (We used a plug cutter and took the time to closely match the plug grain with each settee part.)

2 Glue the plugs into the counterbores, with the grain of the plug going in the same direction as the grain of the piece being plugged (we used woodworker's glue).

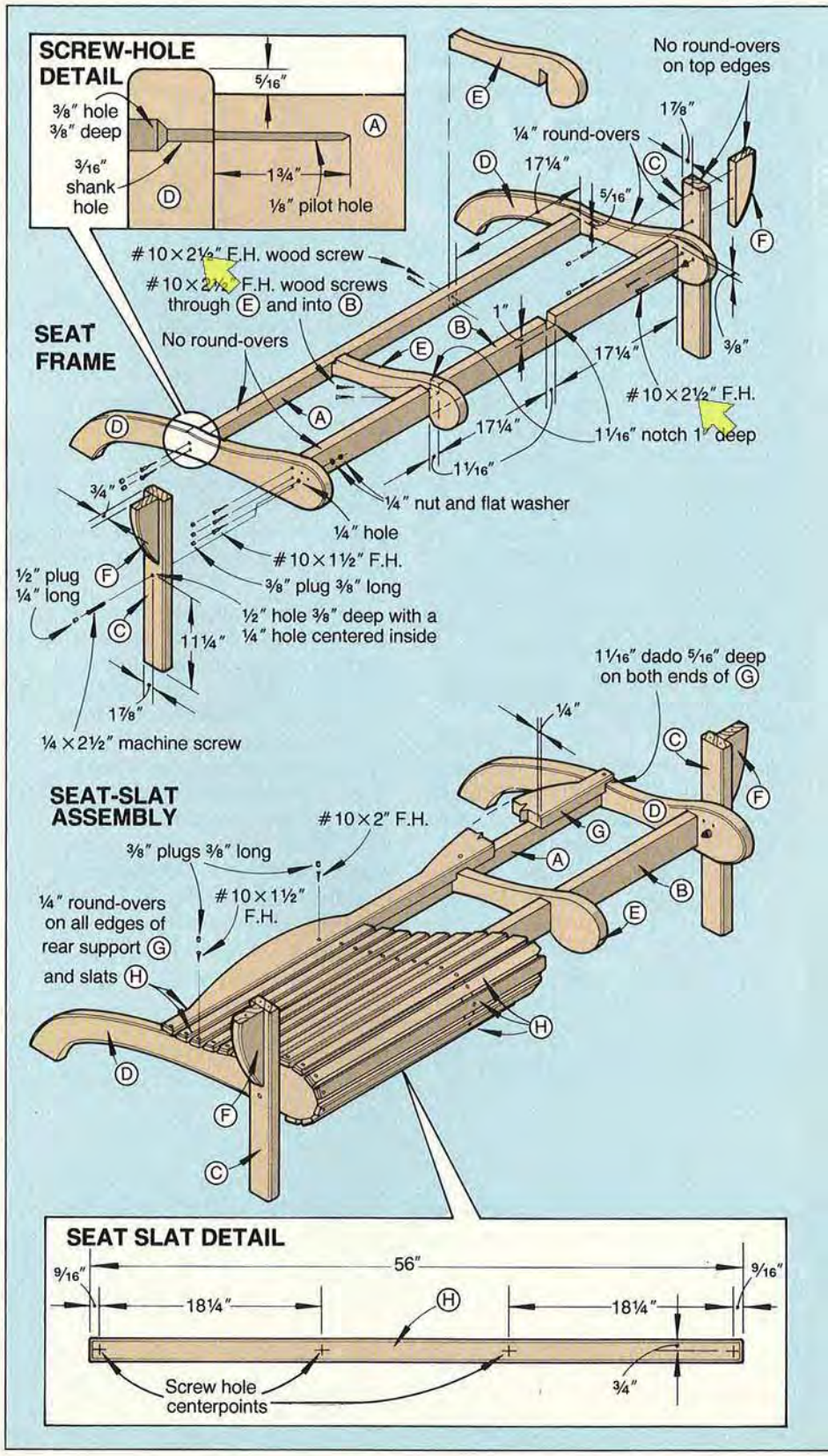
Now, move on to the rear support and slats

1 Bandsaw the rear support (G) to shape. Transfer the two reference lines from the template to the top back edge of the support. Rout a ¼" round-over along the edges of the support. Cut a 1 1/16" dado 5/16" deep on each end of the support.

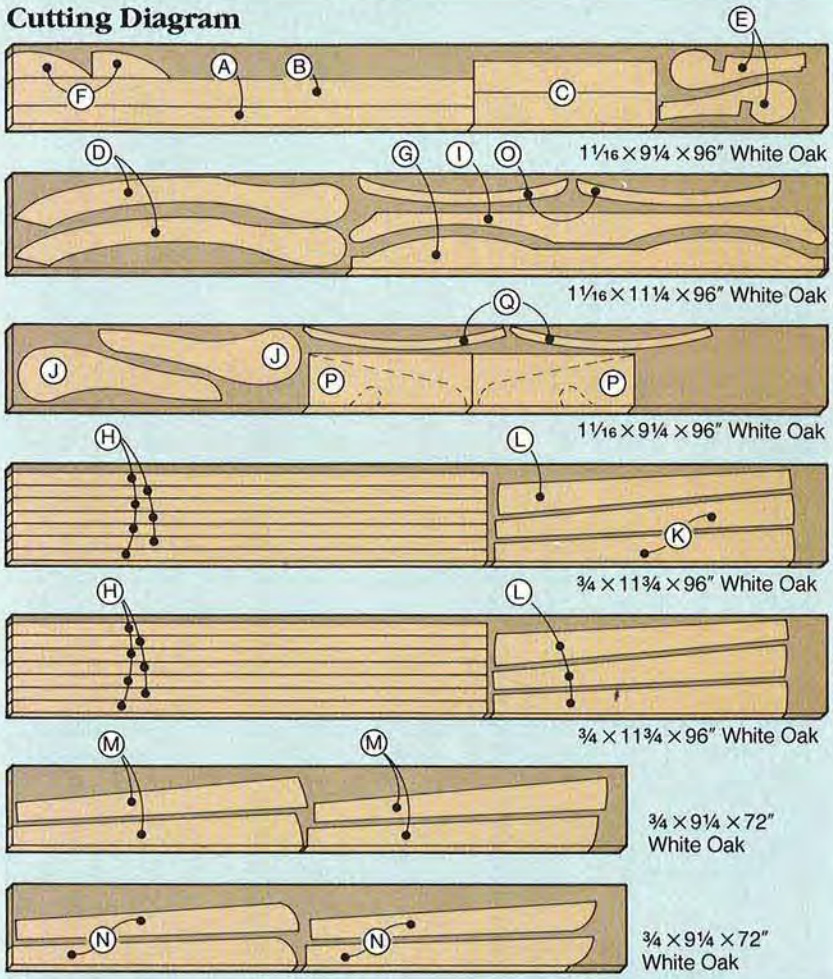
2 With the front edge of G ¼" ahead of the front face of A, clamp the rear support in position. See the Section View Detail accompanying the Seat Back Assembly Drawing on page 66 for reference.

3 Drill mounting holes, and fasten the rear support to the seat frame.

4 Cut the 14 seat slats (H) to size. Rout a ¼" round-over along all edges of each slat. Drill and counterbore the mounting holes in each slat. See the Seat Slat Detail accompanying the Slat Assembly Drawing for hole locations.



Cutting Diagram



Bill of Materials

Part		Grid Size* T	W	L	Matl.	Qty.
SEAT FRAME						
A	rear rail	1 1/16"	2 1/8"	53 7/8"	WO	1
B	front rail	1 1/16"	3 1/4"	53 7/8"	WO	1
C	legs	1 1/16"	3 3/4"	21 1/4"	WO	2
D*	end supports	1 1/16"	6"	40"	WO	2
E*	center supports	1 1/16"	6"	17"	WO	2
F*	armrests supports	1 1/16"	3"	10"	WO	2
SLAT SUPPORTS AND SLATS						
G*	rear support	1 1/16"	4"	56"	WO	1
H	seat slats	3/4"	1 1/2"	56"	WO	14

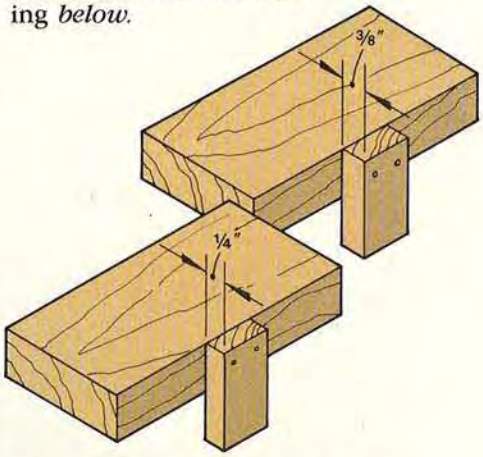
Part		Grid Size* T	W	L	Matl.	Qty.
SEAT BACK ASSEMBLY						
I*	rear-slat support	1 1/16"	4"	56"	WO	1
J*	armrests	1 1/16"	7"	25"	WO	2
K*	slats	3/4"	4"	36"	WO	2
L*	slats	3/4"	4"	36"	WO	4
M*	slats	3/4"	4"	35"	WO	4
N*	slats	3/4"	4"	34"	WO	4
O*	top slat supports	1 1/16"	3"	26"	WO	2
P*	center piece	1 1/16"	12"	20"	EW	1
Q*	braces	1 1/16"	3"	25"	WO	2

Parts A, B, C, and H are cut to the sizes listed above. The dimensions of the remaining parts (marked with an *) are the sizes of the 1" grid pattern for each.

Material Key: WO—white oak, EW—edge-joined white oak

Supplies: spray adhesive, 1/8" or 1/4" hardboard, flathead wood screws (stainless-steel or galvanized deck screws) in the following sizes: #10×1", #10×1 1/2", #10×2", #10×2 1/2", 1/4×2 1/2" machine screw with flat washer and nut (stainless steel or brass), 1/4×1 1/2" machine screw and nut, clear finish.

5 Cut the pieces and build four 1/4" spacers and four 3/8" spacers like those shown in the drawing *below.*



6 Position the 3/8" spacers between the rear support (G) and the first seat slat where shown in the photo *below.* Now, as shown, screw the seat slat to the end and center supports (D, E). Repeat the process with the 3/8" spacers to space and fasten the next seven slats to the seat frame. Then, switch to the 1/4" spacers for the next four slats that go around the curve. Finally, switch back to the 3/8" spacers to add the final two slats to the frame.

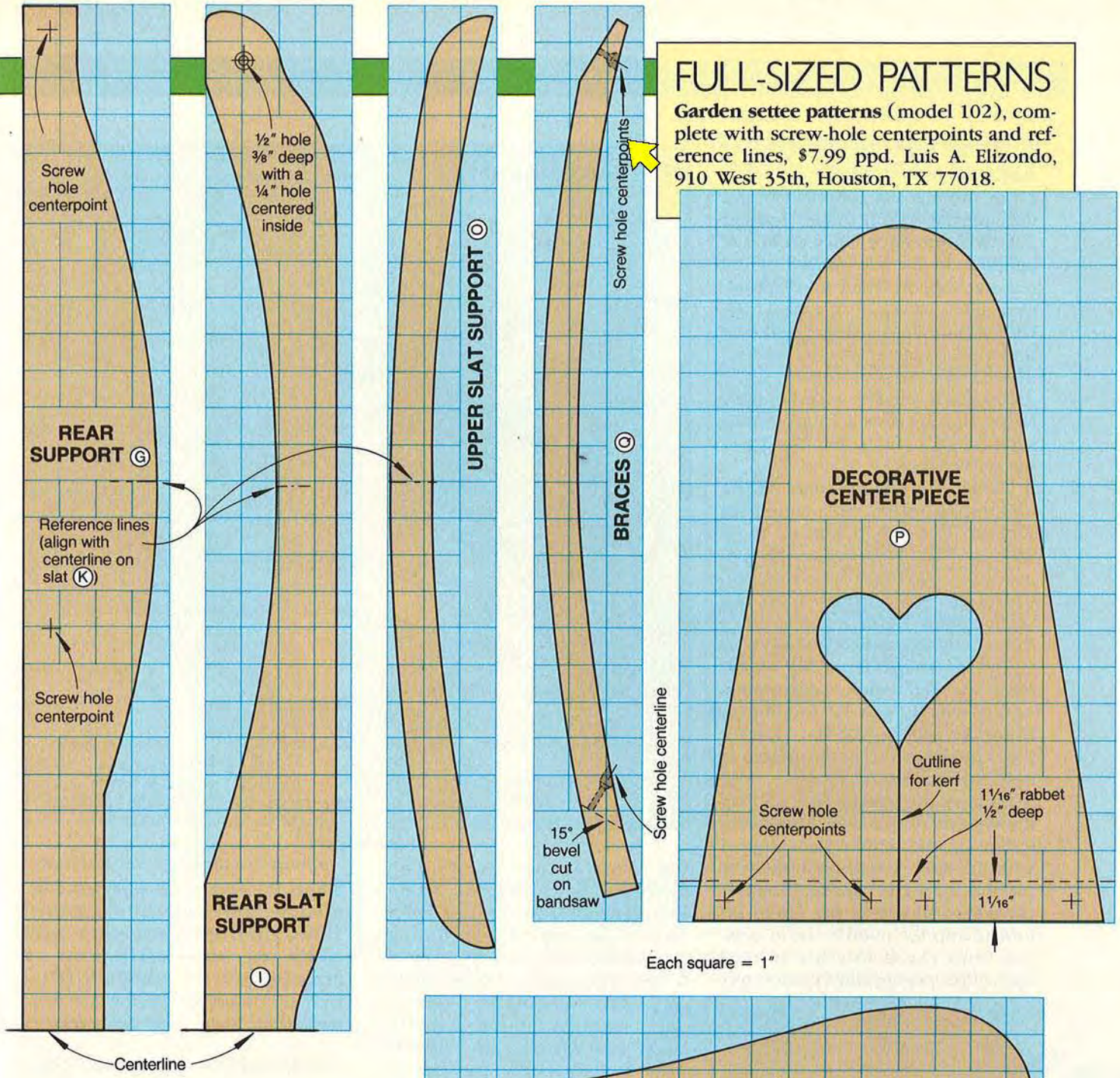
With the spacers in place, clamp a seat slat to the rear support, and screw the slat to the support pieces.

Continued

Each square = 1"
BACKREST SLATS Ⓝ
Screw hole centerpoints
BACKREST SLATS Ⓜ
BACKREST SLATS Ⓛ
Screw hole centerpoints
Centerline
BACKREST SLATS Ⓚ
¼" hole
Screw hole centerpoints
END SUPPORT Ⓓ

FULL-SIZED PATTERNS

Garden settee patterns (model 102), complete with screw-hole centerpoints and reference lines, $7.99 ppd. Luis A. Elizondo, 910 West 35th, Houston, TX 77018.



Continued

Add the contoured seat back assembly next

1 Cut the rear-slat support (I) and the armrests (J) to shape. Transfer the two reference lines from the template to the top surface of the rear-slat support. Rout a ¼" round-over along all edges of each (I, J). Drill the mounting holes, and bolt the pieces together with ¼×1½" machine screws and nuts.

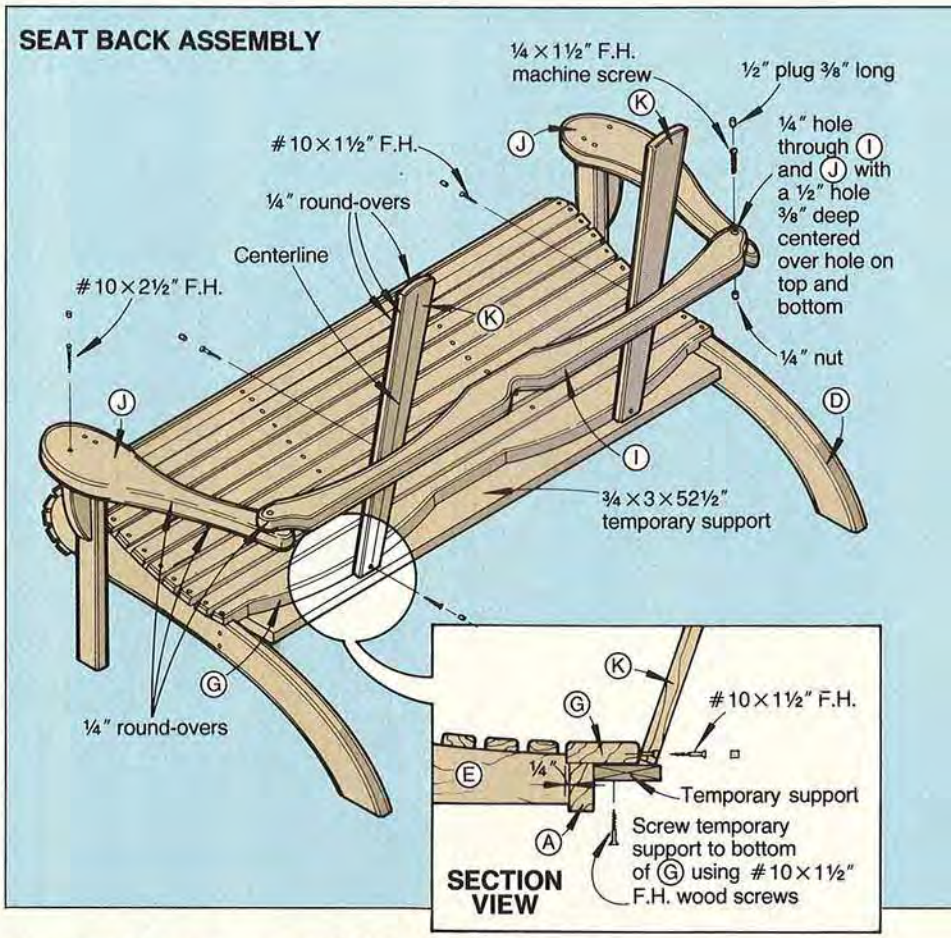
2 Using just one screw per armrest, fasten the armrests to the armrest supports (F). (Later, you'll add two screws per arm.)

3 To get the bottom edges of the backrest slats flush, cut a temporary support from ¾"-thick stock to 3" wide by 52½" long. Fasten the support to the bottom of the rear support (G) where shown on the Section View Detail at *right.*

4 Bandsaw the seat back slats (K, L, M, N) to shape from ¾" stock. Mark the screw-hole centerpoints on the slats. Rout a ¼" round-over along all edges of each slat. Transfer the centerline onto both surfaces of both middle slats (K).

5 Position the middle slats (K) on the temporary spacer with the centerline on the middle slats aligned with the reference lines on the rear support (G) and rear-slat support (I) where shown in the photo *below.* Clamp the middle slat in position, and check that the marked screw-hole centerpoints center over the rear-slat support. Drill the mounting holes. See the Section View Detail for reference before drilling the angled hole through the slat and into the rear support.

Align the top and bottom supports, position the center slats, and fasten them to the supports.


SEAT BACK ASSEMBLY
¼×1½" F.H. machine screw
½" plug ⅜" long
#10×1½" F.H.
¼" hole through (I) and (J) with a ½" hole ⅜" deep centered over hole on top and bottom
¼" round-overs
Centerline
#10×2½" F.H.
¼" nut
¾×3×52½" temporary support
¼" round-overs
#10×1½" F.H.
Temporary support
Screw temporary support to bottom of (G) using #10×1½" F.H. wood screws
SECTION VIEW

6 Fasten the center slats (K) to the rear support and rear-slat support. When fastening each backrest slat, drive the bottom screw partway and then drive the top screw partway, continue until each screw is snug. For ease in attaching the slats, do not insert one screw all the way before inserting the other.

7 With the assembly square, drive the remaining two screws through each armrest (J), and into the leg tops.

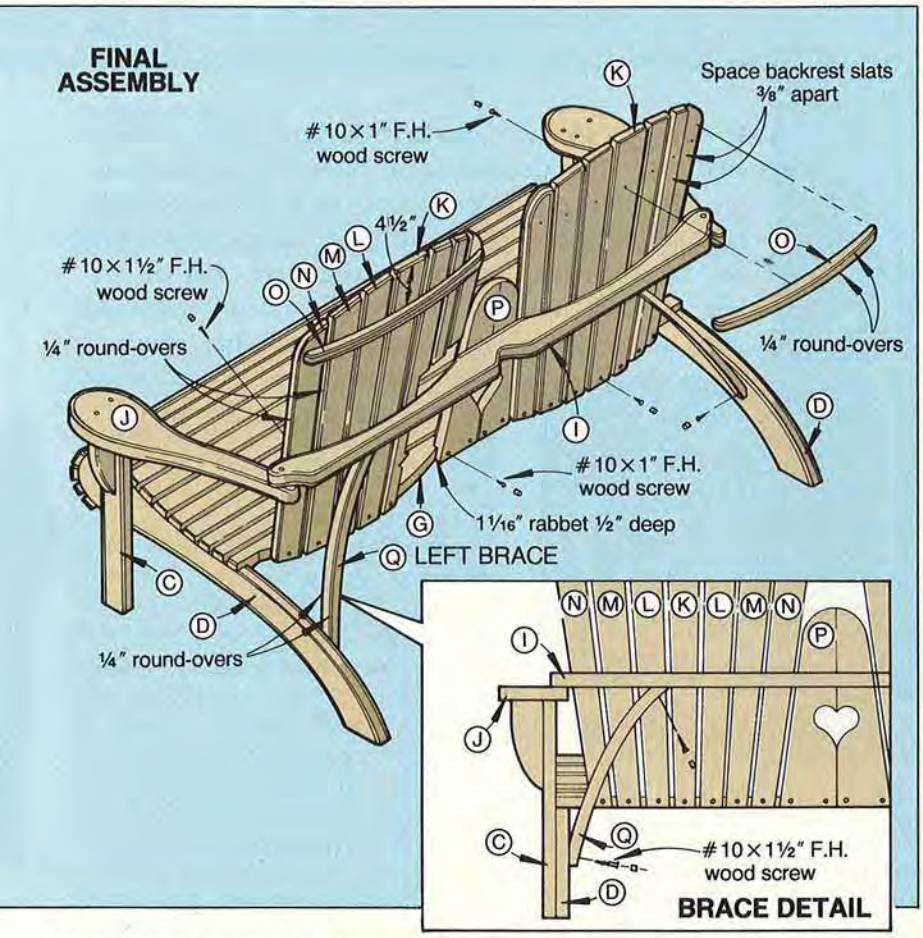
8 Using the ⅜" spacers, position the backrest slats, drill the mounting holes, and fasten the slats to the settee frame.

9 Cut the upper-slat supports (O) to shape, and rout a ¼" round-over along their edges. Center and clamp one upper-slat support in place against the seat-back slats. Drill the holes and screw the support to the slats. Plug the holes.

Now, fashion and install the decorative center piece

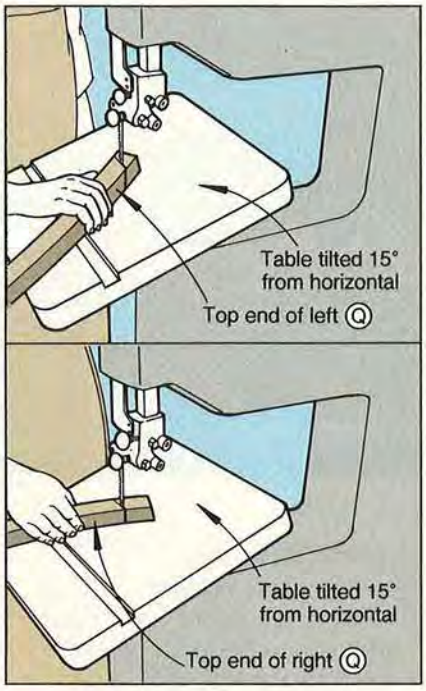
1 From 1 1/16" oak stock, cut two pieces 6" wide by 22" long. Joint or plane one edge of each piece and then edge-join the pieces together to form the center piece (P). Transfer the full-sized pattern outline and heart opening from the template to the center-piece blank.

2 Cut or rout a 1 1/16" rabbet ½" deep along the bottom front edge of the center piece where shown on the Final Assembly Drawing on the opposite page.



Time to add the braces and then apply the finish

1 Cut the braces (Q) to shape. Following the two-step drawing *below,* bandsaw the bevels on the top end of the braces. Rout a ¼" roundover along the edges of both.



2 Position the top end of one brace against the rear-slat support (I), and center the lower end on the supports (D) where shown on the Brace Detail *above left.* You'll need to move the brace around until no gap exists between the ends of the brace and the mating surfaces (D, I). Once positioned, tape the brace in place, drill the mounting holes, and fasten it to parts D and I. Repeat the procedure to position and secure the remaining brace.

3 Plug the remaining counterbores. Sand the settee smooth. Finish the settee as desired. (We brushed on several coats of clear Olympic Wood Preservative.)

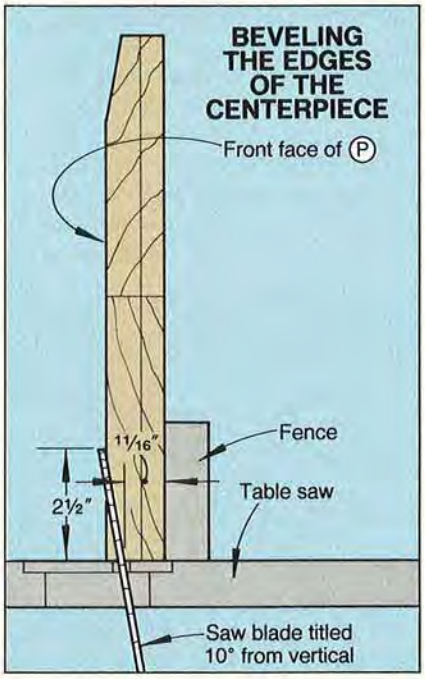
3 Bandsaw the center-piece outline to shape. Using a ¼" blade on your bandsaw, start at the bottom of the center piece, cut through the joint line to the heart outline, and then cut the heart opening to shape.

4 Raise your tablesaw blade 2½" above the saw surface and tilt it 10° from vertical. Using the drawing at *right* for reference, bevel-rip the edges of the center piece.

5 Sand a ¼" round-over along the front outside edges (except at the rabbet) on the center piece.

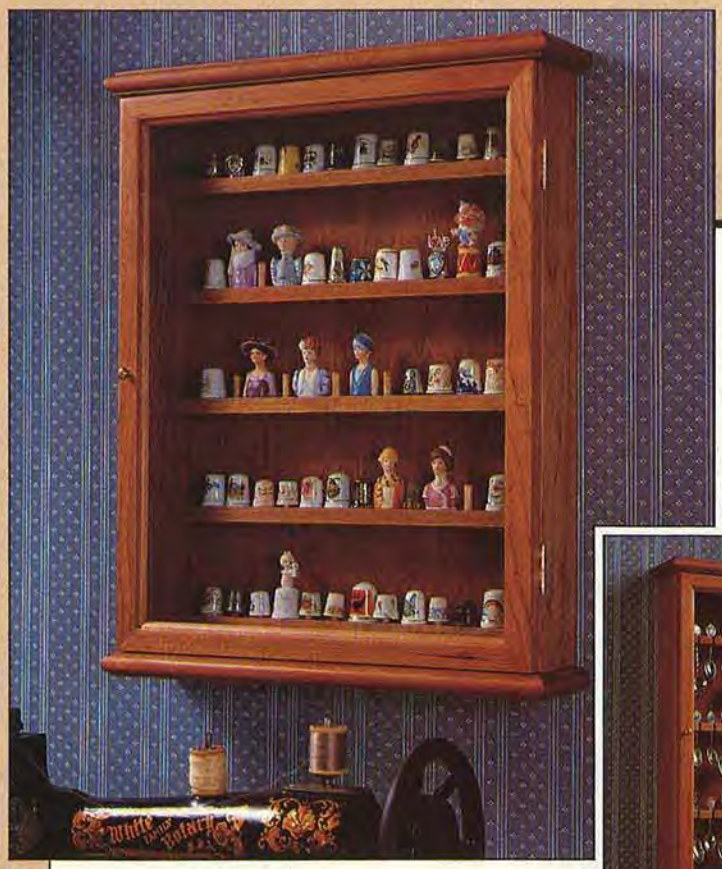
6 With a belt sander and then a palm sander, form a smooth curve on the front of the center piece.

7 Clamp the center piece between the slats. Drill four holes through the center piece and into part G. Mark the hole locations and drill two holes through the center piece and into the rear-slat support (I). Screw the center piece in place.



Produced by Marlen Kemmet
Project Design: Luis A. Elizondo
Photographs: Hopkins Associates; Jim Kascoutas
Illustrations: Kim Downing; Mike Henry

A WALL-HUNG HOME FOR COLLECTOR'S



It doesn't take a Philadelphia lawyer to make a case for this project. For opening arguments, we offer simple dowel joints to form the sturdy case as well as spline-mitered doors. Here are the facts: From first cut to the first coat of finish, it took us less than eight hours to build with about $25 in materials. What's the verdict? The jury declares this another prize-winning project.

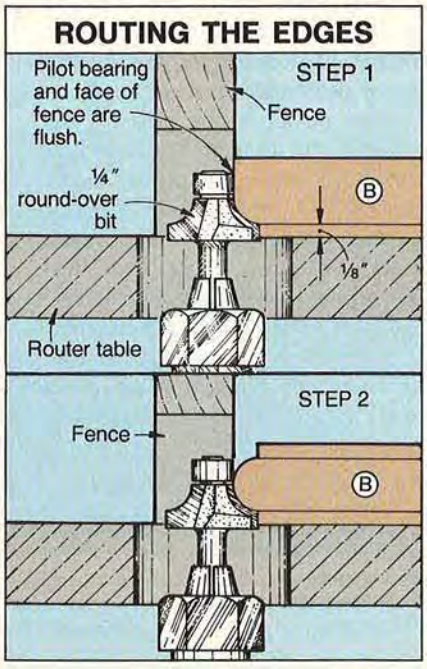
Print this article

Cabinet as display for spoons

Construct the case to get the ball rolling

1 Rip and crosscut the case sides (A) and top and bottom (B) to the sizes listed in the Bill of Materials.

2 Follow the two-step drawing *below* to rout the front edge and ends of the top and bottom pieces (B).



3 Mark the dowel-hole centerpoints on the ends of each case side where shown on the Hole Detail at *right*. Using a doweling jig, drill ⅜" holes 9/16" deep.

4 Place dowel centers in the holes just drilled. Center the sides (A) between the top and bottom (B) where shown on the Exploded-View Drawing. Clamp together the pieces to transfer the hole locations to the top and bottom pieces. (Depending on how many dowel centers you have, you might have to do one joint at a time.) Transfer the ⅜" bit to your drill press, and drill ⅜" holes 9/16" deep where marked.

5 Sand the four pieces. Using ⅜" dowel pins 1" long, glue, dowel, and clamp the sides between the top and bottom pieces, checking for square. Immediately remove excess glue with a damp cloth.

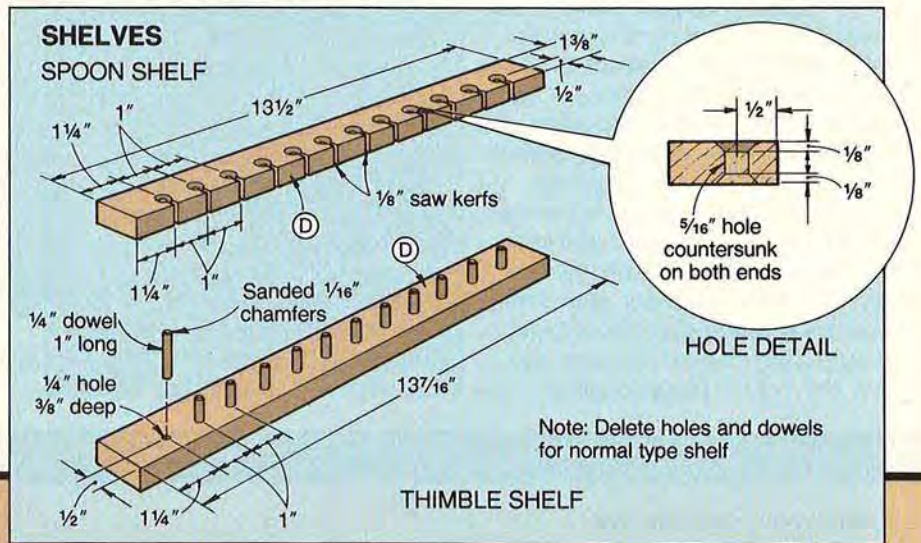
6 To house the back (C), rout a ⅜" rabbet ¼" deep along the back inside edge of the case frame (A, B). Square the corners with a chisel.

7 Cut the back (C) to size. Drill the mounting holes in the back and case, and screw the back in place.

It's your choice: Spoon or thimble shelves

1 Cut the shelves (D) to size from ½" stock (we resawed ¾" stock to size). You'll need three shelves for spoons or five for thimbles.

Continued



CHERISHED TREASURES
SHOWCASE

Bill of Materials

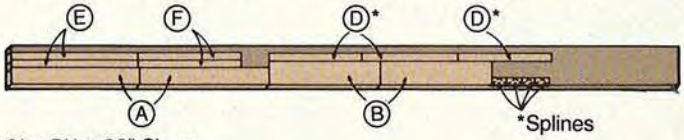
Parts		Finished Size* T	W	L	Matl.	Qty.
CASE						
A	sides	¾"	2¾"	18½"	C	2
B	top & bottom	¾"	3⅞"	16"	C	2
C	back	¼"	14¼"	19¼"	CP	1
D	shelves	½"	1⅜"	13⅞₆"	C	3/5
DOOR						
E*	stiles	¾"	1"	18⅜"	C	2
F*	rails	¾"	1"	15"	C	2

*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

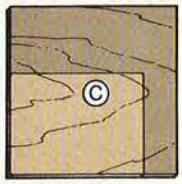
Material Key: C-cherry, CP-cherry plywood

Cutting Diagram

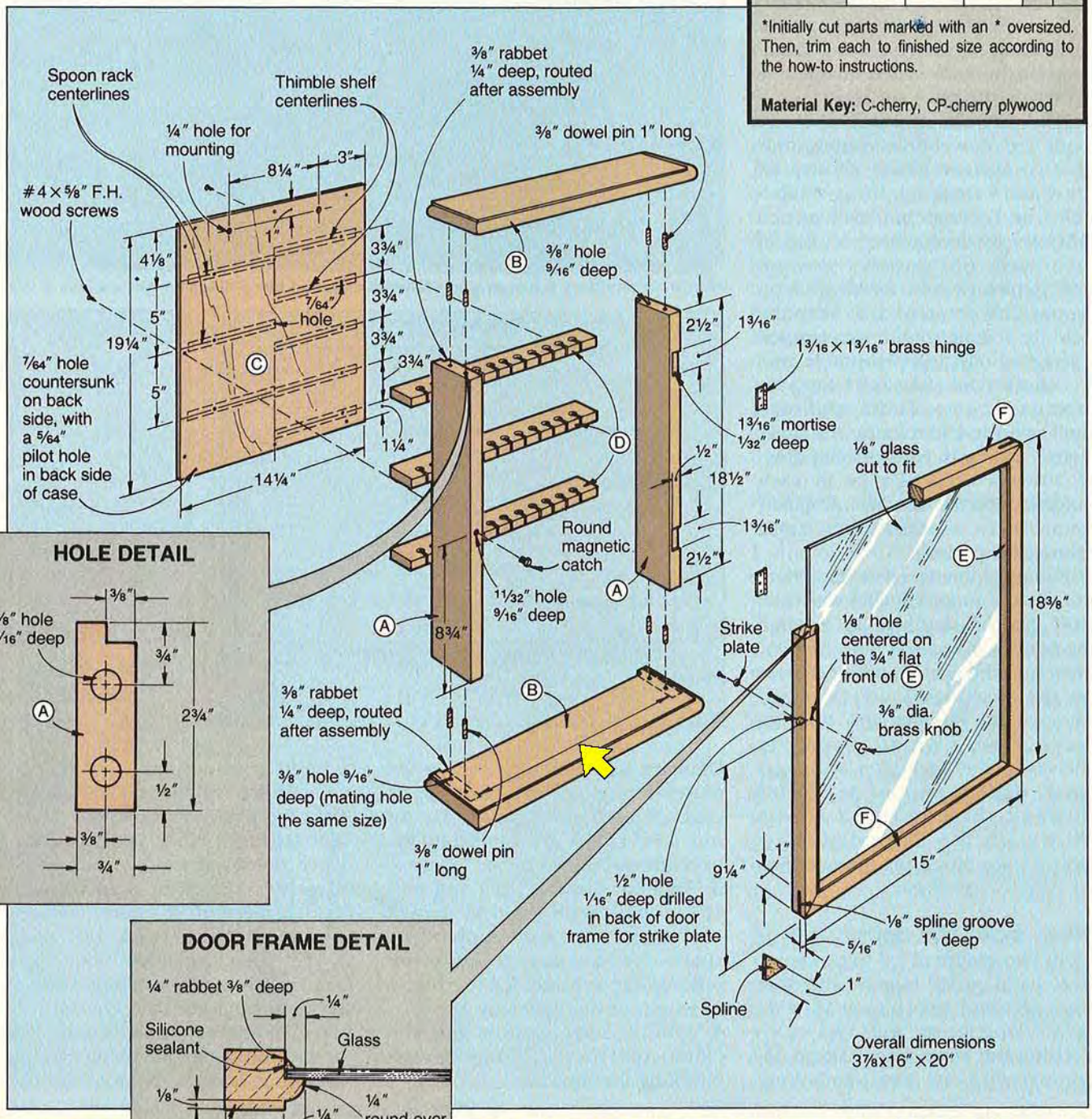
*Plane or resaw splines to ⅛" thick and shelves (D) to ½" thick.



¾ × 5½ × 96" Cherry

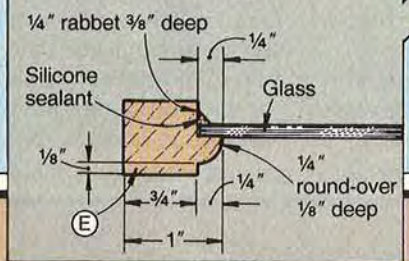


¼ × 24 × 24" Cherry Plywood



HOLE DETAIL

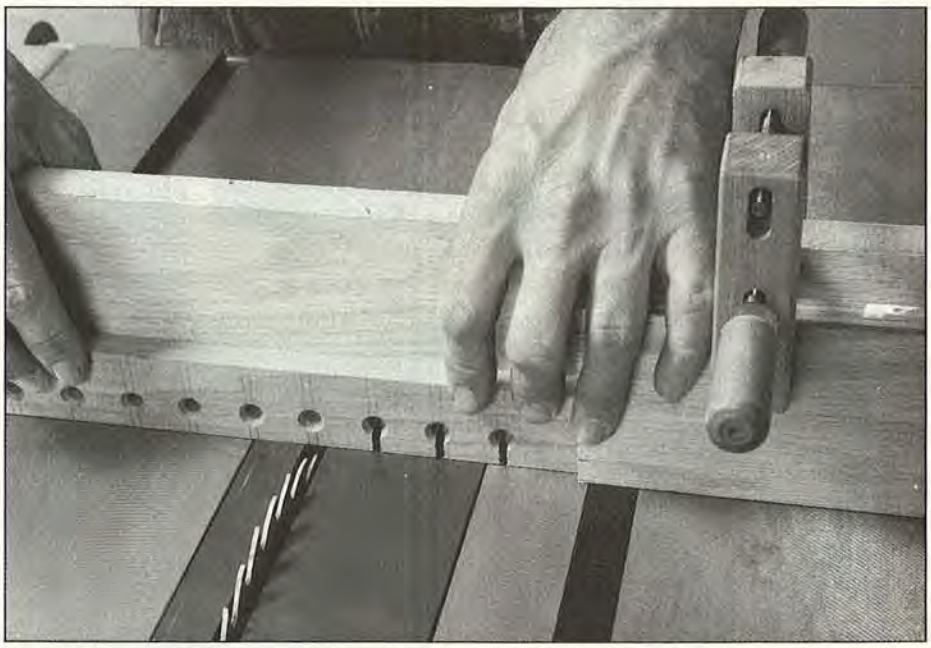
DOOR FRAME DETAIL



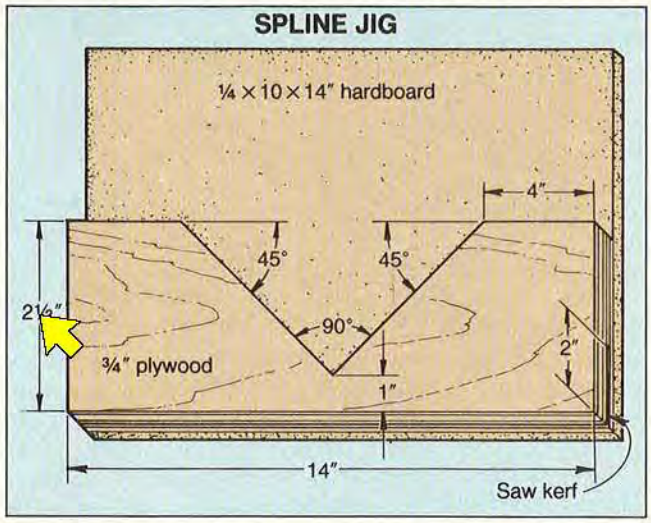
2 For the spoon shelves, mark the hole centerpoints where dimensioned on the Shelves Drawing. Drill and countersink a 5/16" hole at each centerpoint (see the Hole Detail on the drawing for reference). Flip over the piece and countersink the holes on the opposite surface.
3 With a combination square, mark the kerf locations centered on the holes just drilled. Attach an auxiliary fence to your miter gauge. Raise your blade ½" above the saw table, and cut the kerfs where marked as shown in the photo at *right*.
4 To build the thimble shelves, mark the dowel-hole centerpoints on five shelves where shown on the Shelves Drawing. Using a brad-point or Forstner bit, drill twelve ¼" holes ⅜" deep where marked in each shelf. (To ensure consistent hole depths, we set the depth stop on our drill press. And, to keep the holes in a straight line, we clamped a fence to our drill-press table.)
5 Cut sixty ¼" dowels 1" long for the thimble posts. Finish-sand each shelf smooth, and then sand a slight chamfer on both ends of each dowel. Place a drop of glue in each hole, and tap the dowels into place. Immediately wipe off excess glue with a damp cloth.
6 Using double-faced tape, adhere the shelves in position in the case. Drill the 7/64" shank holes through the back (C) and 5/64" pilot hole ½" deep into the shelves where shown on the Exploded-View Drawing. Remove the shelves and double-faced tape. (We attached the shelves to the back after staining.) Now, drill a pair of ¼" holes through the case back where shown on the Exploded-View Drawing for mounting the completed case to a wall later.

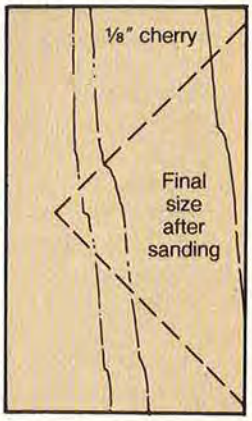
Now, build the door

1 Cut two pieces of ¾"-thick cherry to 1" wide by 20" long for the door stiles (E) and two pieces 1" wide by 16" long for the rails (F).
2 Using the Door Frame Detail accompanying the Exploded-View Drawing for reference, rout a ¼" round-over along the front inside edge of each door piece. Cut or rout a ¼" rabbet ⅜" deep along the back inside edge to house the glass.
3 Miter-cut the stiles (E) and rails (F) to the lengths listed in the Bill of Materials. (For extra support, we attached an auxiliary fence to our miter gauge and mitered the pieces to length on the tablesaw.)
4 With the surfaces flush, glue and clamp together the door frame, checking for square.



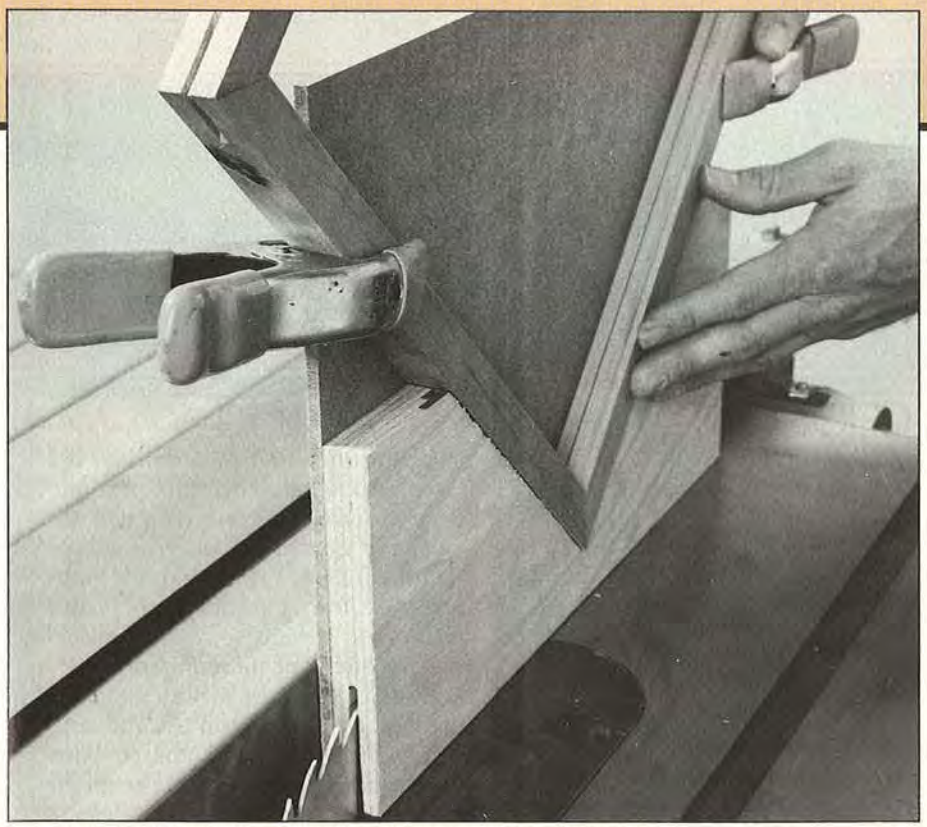
Mount an auxiliary fence to your miter gauge, and cut the kerfs.



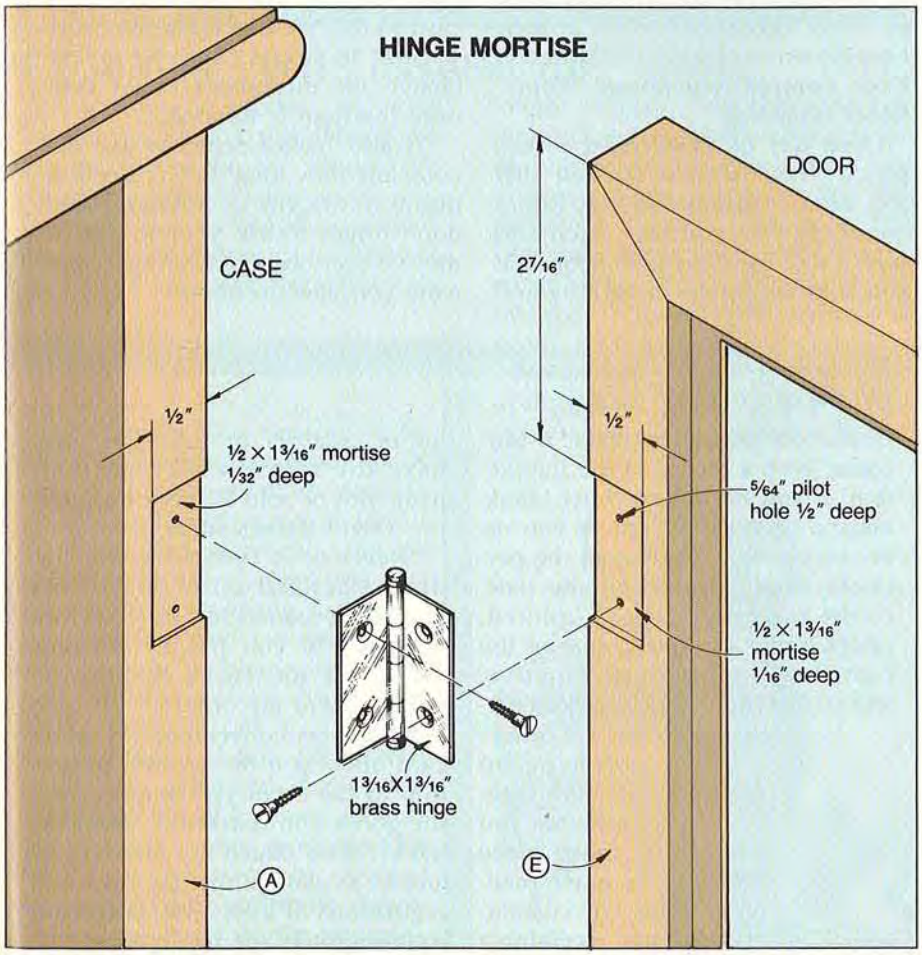


FULL-SIZED SPLINE

5 Build a spline jig to the dimensions shown on the drawing *above*. Raise the blade 2" above the tablesaw surface. Now, as pictured *above right,* cut a ⅛" kerf 1" deep in each corner of the door frame.
6 Cut a piece of ⅛" cherry (we resawed a thicker piece) to 1¼" wide by 12" long. Next, cut four slip-feather splines to 2⅛" long. Glue a spline in each kerfed corner of the frame. When dry, trim or sand off the protruding spline, being careful not to cut or sand the door frame.



Cut a kerf through each mitered corner of the door frame.



Attach the hardware

1 Mark the hinge locations on the right side piece (A) where shown on the Exploded-View Drawing. Using double-faced tape, adhere the hinges to the side piece. With an awl, poke through the tape and screw holes in the hinge and into the side piece. Next, drill the hinge mounting holes.

2 With a hobby knife, score the outline of the hinges. Remove the hinges and tape. Using a sharp chisel, form a pair of 1/32"-deep mortises in the side piece (A), cutting to the scored outlines. Screw the hinges to the side piece.

3 Repeat the process in steps 1 and 2 *above* to form a pair of 1/16"-deep mortises in the door.

4 Drill the mounting hole for the magnetic catch where shown on the Exploded-View Drawing. To fasten the strike plate to the mating location on the back side of the door, drill a 1/2" hole 1/16" deep with a 5/64" pilot hole centered inside.

5 Drill the 1/8" mounting hole, and attach the knob where shown on the Exploded-View Drawing.

Remove the hardware and apply the finish

1 Remove the hinges, magnetic catch and strike plate, and knob. Finish-sand all the parts.

2 Wipe on the stain. Using 3/4" wood screws, fasten the shelves to the plywood back. Apply the finish.

3 Have a piece of 1/8" glass cut to fit the door. (We secured the glass in the door frame with a fine bead of clear silicone sealant.)

4 Attach the hardware and door. Place the case back into the rabbeted opening, drill the holes, and then screw the back in place. Level and fasten the case to the wall.

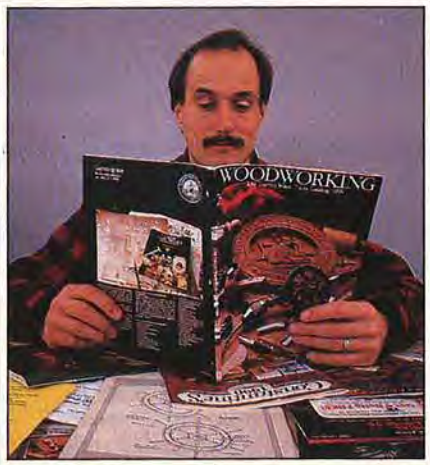
Buying Guide

● **Hardware kit.** 1 3/16 x 1 3/16" solid-brass butt hinges; 3/8"-diameter polished knob, magnetic catch. Kit no. 71042, $5 ppd. Klockit, P.O. Box 636, Lake Geneva, WI 53147. Or, call 800-556-2548 to order.

Produced by Marlen Kemmet. Project Design: James R. Downing. Photographs: Hopkins Associates; Jim Kascoutas.

Print this article

The woodworker's survival MAIL-ORDER



A few Saturdays ago, I drove around town to shop for a self-centering doweling jig, but came home empty-handed and grumbling. "I'll just order it out of a catalog," I said to myself. So I thumbed through a stack of catalogs until I found the jig I wanted.

"Whoa, I don't know anything about these guys," I realized. "How do I know they won't rip me off?" In spite of those misgivings, I really wanted that jig. It was time for a little investigating.

Bill Krier
Product/Techniques Editor

CHOOSING THE RIGHT CATALOG

Before I buy anything, I like to know something about the people I'm dealing with. So, I called several mail-order firms. Eagerly, the people at the other end ticked off the advantages of mail order. A few; Large selection (even hard-to-find tools), at-home convenience, and it's easy to compare prices.

Still, I was uneasy. So, I talked to Roger F. Campbell of the Council of Better Business Bureaus in Arlington, Virginia. "One way to check out a mail-order business is to call the Chamber of Commerce or Better Business Bureau in their hometown and ask if customers have complained about them," Roger suggested.

Chett Ray of Woodworkers Supply of New Mexico advised that you ask the catalog company lots of questions: "Do you have such and such a tool in stock? How soon will you ship my order? Is packing and shipping included in the price? If I have problems with the product, do you have someone who can answer my questions? Do you accept credit cards? If I don't like the merchandise, can I return it for a full refund? If I want to, can I talk to the president of the company?"

David Draves of Woodcraft Supply suggested that you ask the supplier when they will charge your credit-card account. "Like most mail-order firms, we process a check as soon as we receive it: We have to treat checks as if they're cash so that we can fulfill the order within 48 hours. But, we never charge the customer's credit card until the item is shipped.

"It also makes sense to ask the company how long they've been in business," David continued. "And don't forget to ask your friends if they've ever ordered from the company you have in mind."

PAYING THE BILL

Once you decide to make a purchase, keep a record of the transaction. If you fill out an order blank, make a photocopy of it. If you order by phone, jot down all the pertinent details, including the date, credit card used, items ordered, prices, order number, name of the customer-service representative, and so on. Then, ask the representative to repeat the order.

Before you hang up the phone, let the company know whether you want your name made available to other mail-order firms. "If customers don't like receiving a lot of catalogs in the mail, they have the right to ask that their name not be sold to other businesses," David Draves advised.

"Never send cash with your order," Chet Dalzell of the Direct Marketing Association in New York told me. "If you pay by personal check, jot the check number on your copy of the order."

Besides its convenience, a credit card offers you the greatest protection in the event you don't receive the goods you ordered. I called the banker who issued my MasterCard, and he explained that the rules and regulations of VISA and MasterCard solidly protect the cardholder.

guide to buying...

PRODUCTS

OCCASIONALLY, A BAD APPLE

Although the vast majority of mail-order houses deal reputably, every now and then a consumer gets burned by a less-than-honorable firm. Lou Howard of Amityville, New York, knows the meaning of these words all too well.

Lou sent off a bank draft for $3,410 to Tools-To-Go, a Miami-based mail-order firm. He ordered a Scheppach woodturning lathe, a copying attachment, and a planer. When the equipment failed to arrive, Lou tried to call Tools-To-Go, and learned that its phone had been disconnected.

So, imagine Lou's surprise when he found representatives of the firm exhibiting at a weekend woodworking show near his hometown. Seizing the opportunity, he bored in with questions, and they had pat answers every time.

As it turned out, that was the last time he had contact with anyone from that operation. Tools-To-Go vanished. To make a long story short, Lou eventually received his tools from the West German manufacturer's cost. (See page 14 of the February 1990 issue of *WOOD* magazine for more details.)

Lou Howard

"Two things I would say about this," Lou remarked. "What were Ben Franklin's words? 'Experience teaches a dear school, but the fool will learn in none other.' Also, I'll never send off for anything again unless I charge it to a credit card or insist on C.O.D."

DEALING WITH DISAPPOINTMENT

At one time or another, we've all bought something that left us unhappy. Or maybe the product arrived damaged. What's next?

If the product arrives in a damaged container, you can refuse the shipment and save yourself some freight charges. Even if you accept the package, note the damage on the shipping list before signing.

Most dealers accept returns, but they may assess a restocking fee (normally about 10 percent) to recover some of the shipping costs incurred when filling the order and taking it back.

When you talk to a mail-order dealer about returning goods, try not to unload your anger. "If you act reasonable, the dealer may waive the restocking charge as a goodwill gesture," Shiraz Balolia of Grizzly Imports told me.

"Also, if the tool needs minor repairs that you can make and the dealer has the parts, negotiate a compromise rather than insisting on a new one. You'll both come out better," Balolia added.

Finally, if you can't settle a mail-order dispute, write to the Direct Marketing Association's Mail Order Action Line at: 11 West 42nd St., P.O. Box 3861, New York, NY 10163. Remember to include documentation of the transaction and a description of your problem. The organization will contact the mail-order firm and attempt to resolve the problem. You can also file a report with the local Better Business Bureau, the U.S. Postal Service, and the state attorney general's office.

Editor's Note: By the way, I finally ordered that doweling jig and a nice set of drill bits to go with it. My package arrived in five days.

For example, you have up to 60 days after the issuance of a VISA or MasterCard statement to dispute the charge. This charge will appear on subsequent statements, but no interest will be charged for that amount. After receiving the necessary sales slips and a written statement of your problem, the issuing bank will research the dispute and charge the fee back to the merchant, if your claims prove true. You're also protected if the merchant goes out of business. Just remember not to wait more than 60 days after the issuance of your statement to file the dispute. American Express has a similar policy.

Photograph: Hopkins Associates Illustrations: Jim Stevenson

*Collector's Edition

HANDSCREW CLAMPS BUILD YOUR OWN AND SAVE

If you're like most woodworkers we know, you could stand having a few more handscrew clamps around your shop. Now you can—quickly and inexpensively. Our instructions tell how to build 8" handscrew clamps. Be sure to see the Buying Guide for our source of the hardware for this and the other sizes of clamps available. And, don't forget to order the brass "Collector's-Edition" emblem we've had computer-engraved for this project. It really sets these clamps apart from the rest.

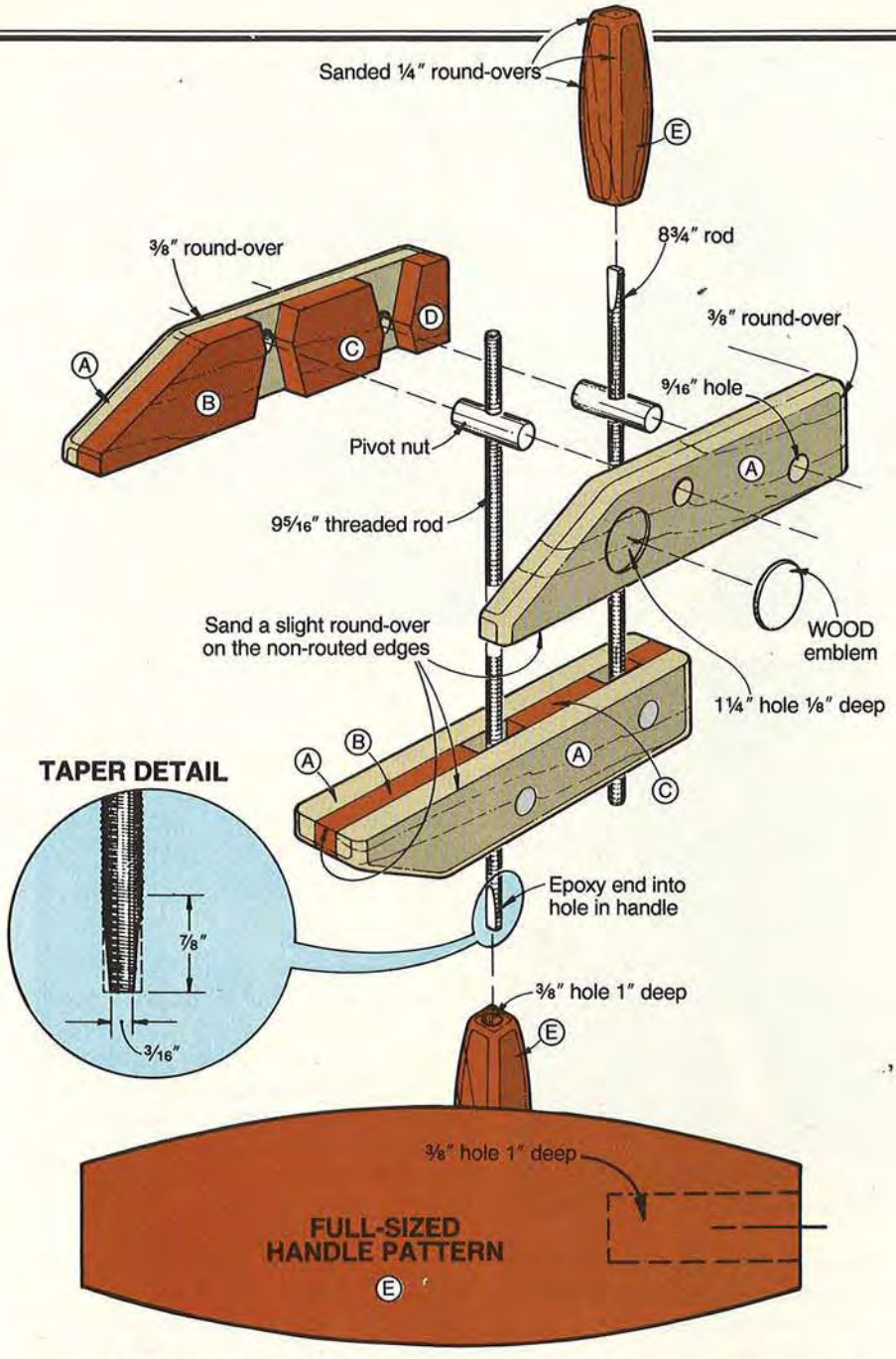
***Note:** You'll need ½"-thick walnut and maple for the clamp jaws. Either resaw or plane thicker stock to size. (We positioned the tablesaw fence ½" from the blade and resawed ¾"-thick stock to ½" thick.)*

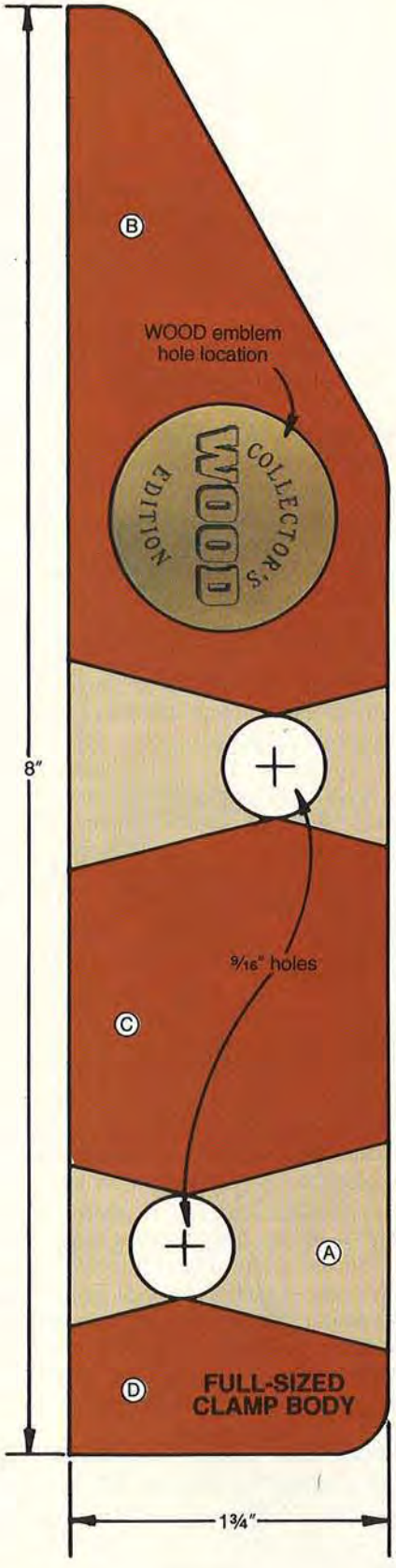
First, machine the jaw parts

1 Cut four pieces of ½"-thick maple and two pieces of ½"-thick walnut to 1¾" wide by 8" long.

2 Using double-faced tape, stick together two pieces of maple face to face, with the edges and ends flush. Repeat with the two remaining maple pieces and then with the two walnut pieces.

3 Using carbon paper or photocopies and spray adhesive, transfer the full-sized patterns (A, B, C, D) at *right* to each lamination. Cut the walnut pieces (B, C, D) to shape.





Next, laminate the jaws

1 With a 9/16" bit chucked in a drill press, bore two holes through each pair of maple pieces where located on the patterns. (For smooth operation of the pivot nuts in the holes, we recommend a brad-point bit.)

2 Taper the fronts of each maple lamination on a bandsaw. Pry apart all the taped-together pieces, remove the tape, and clean off the sticky residue with lacquer thinner.

3 Using the pivot nuts for alignment and the walnut pieces spaced apart where shown on the full-sized pattern, glue and clamp together each clamp jaw as shown in the photo on the following page. (For even clamping pressure, and to prevent denting the maple, we used plywood scraps as clamp blocks. We adhered the plywood to the maple pieces with double-faced tape.) Also, to keep the walnut pieces from sliding around, let the glue get a bit tacky before clamping. Check for slippage after clamping. Remove any excess glue from the openings with a chisel.

Continued

CLAMPS

4 Later, remove the pivot nuts and scrape off the excess glue. Rout ⅜" round-overs along the edges of each jaw where shown on the Exploded-View Drawing. Sand smooth.

5 Drill a 1¼" hole ⅛" deep where shown on the full-sized pattern for the engraved *WOOD* "Collector's-Edition" emblem. (We used a Forstner bit, but a spade bit would also work.) For better adhesion, sand the back of the emblem, and epoxy it into the hole.

Add our customized handles, if desired

***Note:** The kit comes with turned handles. Our handles, though, give you a firmer grip and look better than the turned ones.*

1 Start with a piece of walnut 1¼" square by 12" long. (We laminated ¾" stock, and then jointed both faces to keep the joint line centered.) Crosscut two pieces 3¾" long from the 12" length.

2 Mark diagonals on one end of each 3¾"-long handle blank (E) to find center. Drill a ⅜" hole 1" deep centered in the end of each.

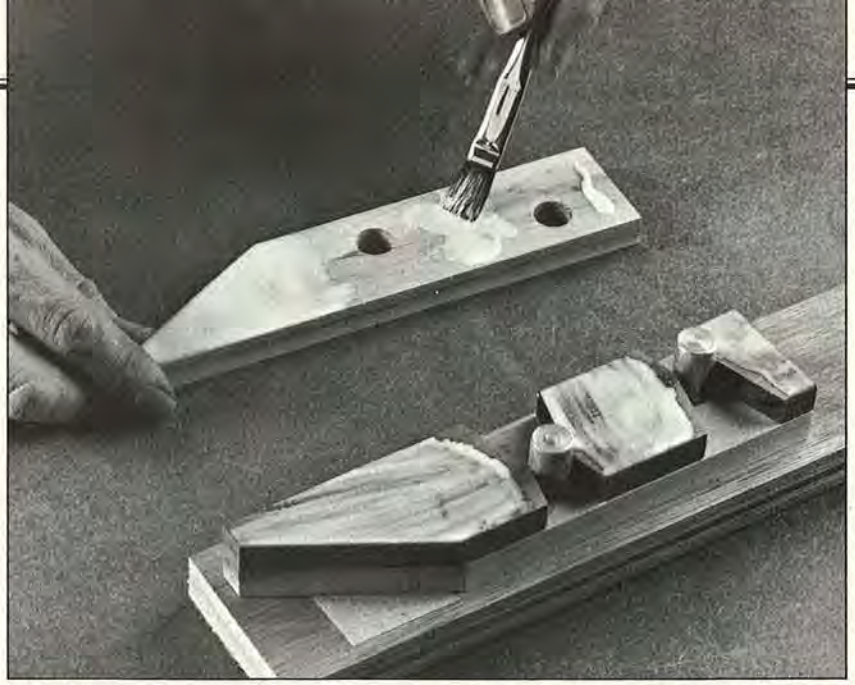
3 Now, stick a 12" length of ⅜" dowel into each of the walnut handles to act as a temporary grip.

4 Transfer the full-sized handle pattern to one face of each handle blank and bandsaw along the marked handle lines. Using double-faced tape, stick the waste pieces back to the edges from which they were cut. Now, transfer the handle outline to an adjacent surface and cut it shape as shown in the photo *above right.*

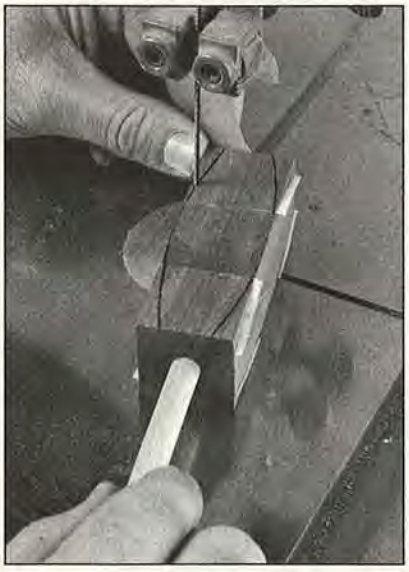
5 Still using the dowel handles as grips, use a stationary belt sander to remove the saw marks from the handles. With a palm sander, sand ¼" round-overs along the edges and sand the handles smooth.

Apply the finish, and install the clamp hardware kit

1 Remove the dowel handles. Apply an oil finish to each part (we used Watco Natural Oil).



▲ **Brush glue onto the mating surfaces and clamp the jaw parts together with the edges and ends flush.**



◀ **Use a temporary dowel handle for stability when bandsawing the walnut handle to shape.**

2 Thread the rods through the pivot nuts as described in steps 7, 8, and 9 of the instructions supplied with the clamp hardware. Close the clamps until the jaws are flush against each other. Now, grind or file the handle end of each threaded rod to the shape shown on the Taper Detail.

3 Epoxy the handles onto the tapered end of each threaded rod where shown on the Exploded-View Drawing. Immediately wipe off any excess epoxy on the rods.

4 If the handles turn a bit rough, put a drop or two of oil (we used WD-40) on each threaded rod. Then, open and close each clamp a few times.

Supplies: double-faced tape, epoxy, spray adhesive or carbon paper, finish.

Buying Guide

● **8" handscrew clamp kit.** Two threaded rods, four pivot nuts, two turned handles. Catalog no. WMS71597, $3.99 (U.S.) per clamp kit, add $2.95 postage and handling per order (not per kit). Leichtung Workshops, 4944 Commerce Parkway, Cleveland, OH 44128. Or, call 800-321-6840 to order.

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DOVETAIL	DV210	3/8	3/8	1/4	4.60
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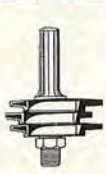

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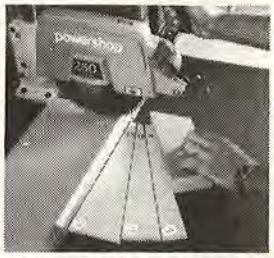

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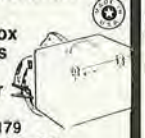

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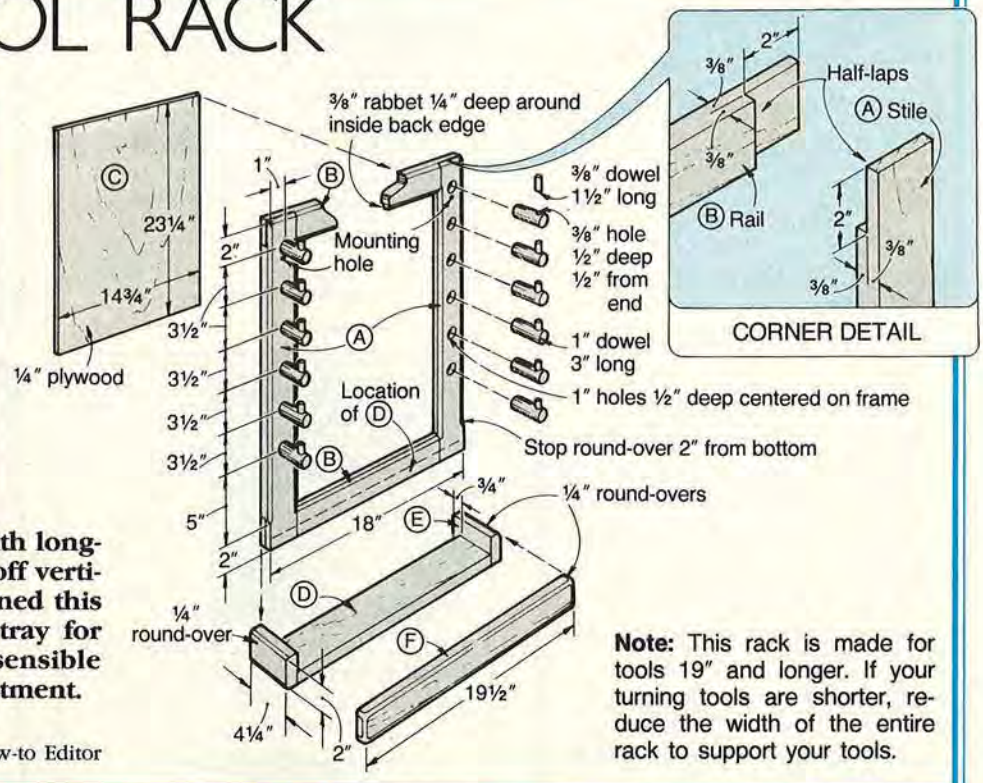

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363	4 X 24 SANDER	181
617	7-1/4" SAW 13 AMP	114
315	7-1/4" SAW 13 AMP	114
314	4-1/2" TRIM SAW	124
690	1-1/2 HP ROUTER	121
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1100	3-1/4" PLANER HD W/CASE	210
2708W	8-1/4" TABLE SAW	257
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9030	1-1/8" X 21" BELT SANDER	135
9900B	3" X 21" BELT SANDER W/BAG	139
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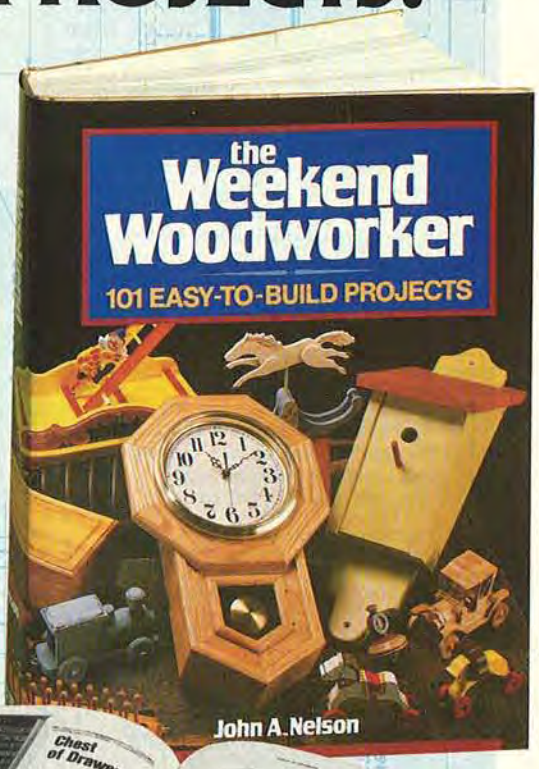

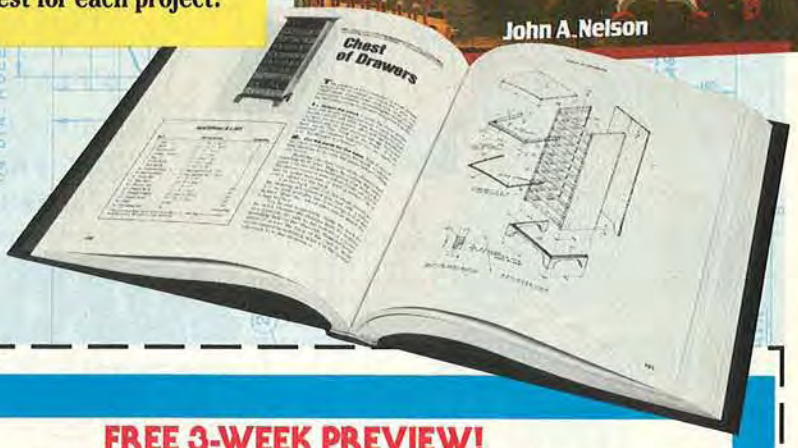

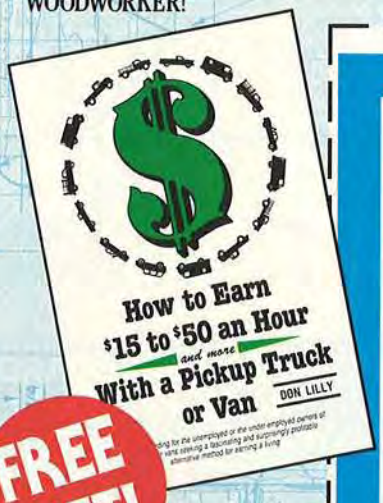

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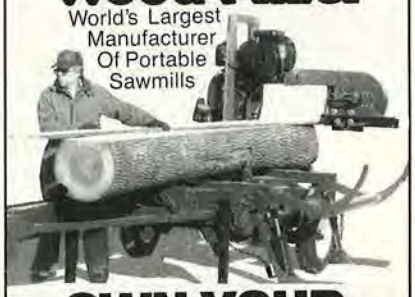

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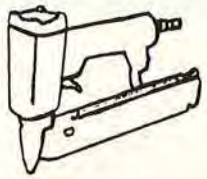

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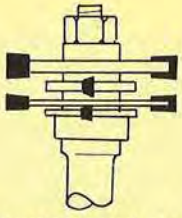

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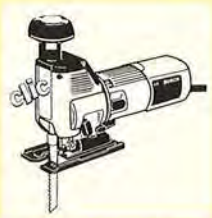

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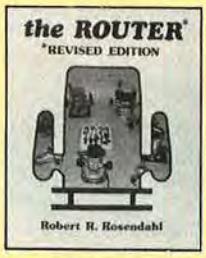

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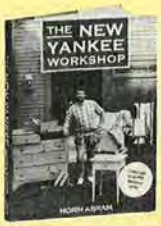

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☐ Solid cherry commode table $169. Ready to assemble, 20" x 27" x 22" high. Also available in walnut, oak and mahogany with matching coffee table. Shipped from stock. Free brochure. ADAMS WOOD PRODUCTS, INC., 974 Forest Dr., Morristown,TN 37814. Or call 615-587-2942.

☐ BravO Designs offers new plans for a unique folding wooden patio chair. The Cradle Chair®, based on an ancient Mayan design, conforms comfortably to natural body lines. This great one day project for intermediate craftsmen requires only basic hand tools. Packet contains plans, materials list, exploded views, assembly techniques. Send $12.50 + $2.50 p+h for Plan #190. BRAVO DESIGNS, P.O. Box 451-F, Brick, NJ 08723.

☐ Portable Drafting Kit with graduated protractor, straight edge and side scales. Professional quality W. German product with durable white plastic surface takes 11x17 paper. Ideal for on-the-spot sketches and drawings. Carrying case included. $82.70 ppd. GARRETT WADE, 161 6th Ave., New York, NY 10013 or 1-800-221-2942.

☐ The New Super Max combines the proven features of the Performax S/T Sander and the infinitely vafiable 0-20"/minute Power Feed with a 5HP motor and heavy duty stand for even greater power, precision, and speed. New brochure includes new accessories for the Performax Component Sander. For free catalog send to: PERFORMAX PRODUCTS INC., 1221 Woodlake Dr., Burnsville, MN 55332. 1-800-334-4910.

☐ Mooserack – full size pattern with step-by-step suggestions. A unique design for a one of a kind coat rack. Makes a great gift for children or adults. A fun, easy project. $6.95. JOBUCK™, Plan #13, 17813 Brooks Blvd, Bothell, WA 98012.

☐ Holiday Candle Holder. Made from a wheel, spindle, candle cup and insert. Wood parts and dowels from MIDWEST DOWEL WORKS, INC,. 4631 Hutchinson Rd., Cincinnati, OH 45248.

☐ Lumber drying – Nyle Corp., the largest manufacturer in the United States of dehumidification Dry Kiln Systems offers *Introduction to Dehumidification Lumber Drying*. Send for free catalog. NYLE CORP, P.O. Box 1107, Bangor, ME 04401-1107 or call 1-800-777-6953 (USA/Canada).

☐ Eagle America offers over 10 different router bit sets, including many specialty sets in attractive wooden cases for moldings, table tops, picture frames, hand rails and door construction. All specially priced for Father's Day. Call 1-800-872-2511 for details. EAGLE AMERICA.

☐ Keep your shop clean and safe from sawdust with this large capacity, commercial style system. The DC-1 Dust Collector features 1 HP motor, 610 cfm air flow and 20 gallon bags. Price is $189.95 + $20 UPS shipping. Includes $15 free accessories. Order from PENN STATE INDUSTRIES, 2850 Comly Rd. Philadelphia, PA 19154, or call 1-800-288-7297.

☐ The Dupli-Carver is a wood duplicating machine that can reproduce three-dimensional carving in wood. The machine uses a stylus (tracer) to follow the contours of a statue or plaque. Two models starting at $359. WOOD-MIZER®, 8180 W 10th St., Dept. QQ29, Indianapolis, IN 46214. 1-800-553-0219, IN 317-271-1542.

☐ You'll forget where you put your miter gauge after using the Dubby on your tablesaw. It's guaranteed for accuracy and, with the optional 97 minute video, even novice woodworkers can complete complex projects quickly, easily and accurately. For information send $1 to: IN-LINE INDUSTRIES, 661 S. Main St., Webster, MA 01570. Orders only, 1-800-533-6709.

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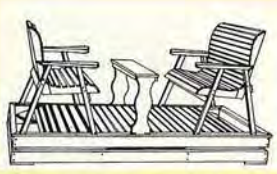

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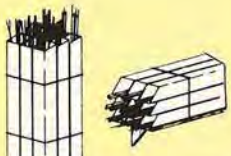

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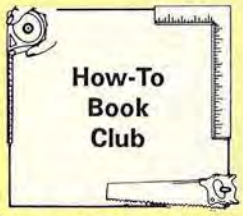

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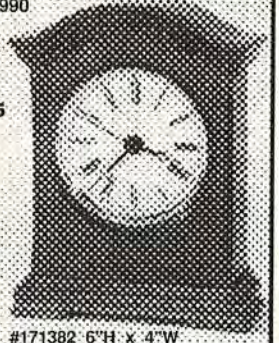
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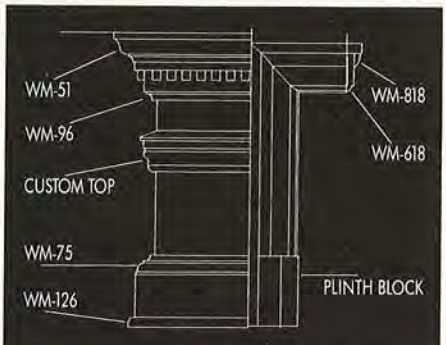

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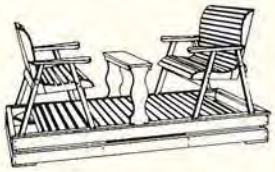

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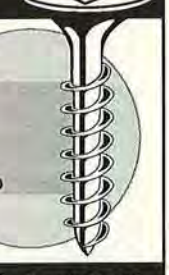

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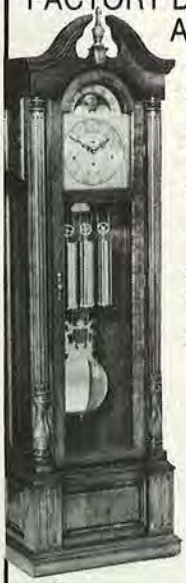

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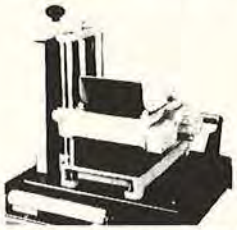

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TO ORDER THESE BOOKLETS, USE COUPON ON PAGE 94

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DECOY AND WOOD CARVERS WISHBOOK—48-page catalog features wide selection of tools and supplies for decoy carvers, wood carvers, wood turners. Chisels, gouges, sharpening stones, precision grinding tools, Foredom tools, Fire Brush burners, pneumatic sanders, glass eyes, pewter feet, patterns, paints, reference books. P. C. ENGLISH, INC. $1.00. *Circle No. 2115.*

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Model		List	Sale
23-700	Wet/dry grinder	201	155
23-680	6" bench grinder ¼ H.P.	81	75
23-880	8" bench grinder ½ H.P.	136	109
23-980	10" bench grinder 1 H.P.	246	235
11-950	8" drill press	164	135
14-040	14" drill press	313	309
40-150	15" hobby scroll saw	178	139
28-160	10" hobby band saw	189	144
31-050	1" belt sander 2.0 amp	93	78
31-460	4" belt/6" disc sander	178	139
31-340	"NEW" 1" belt/8" disc sander	226	175

DELTA STATIONARY

34-761	10" unisaw 1½ H.P.	1715	1399
34-740	Super 10" motorized lable saw	590	429
34-429	10" tilting arbor bench saw 1½ H.P.	1479	875
33-990	10" radial arm saw	727	569
11-072	32" radial drill press	487	409
37-280	6" motorized jointer	440	379
50-179	¾ H.P. 2 stage dust collector	435	339
50-180	1 H.P. dust collector	535	439
50-181	2 H.P. dust collector	760	599
37-154	Deluxe DJ-15 6" jointer w/¾ H.P. motor	1288	1029
22-561	13" planer w/2 H.P. motor	1750	1095
33-050	"NEW" 8¼" Sawbuck	742	545
34-330	"NEW" 8¼" Table Saw 13A	321	209
34-670	10" motorized table saw	437	379
34-985	⅛ H.P. stock feeder	698	599
32-190	"NEW" stationary plate jointer	645	459
36-040	"NEW" 8½ compound miter saw	216	155

MILWAUKEE TOOLS

0399-1	"NEW"12V cdlss var/spd drill w/batt., charger & case	280	155
0395-1	9.6V cdlss. drill w/case	264	149
0219-1	9.6V cdlss. drill w/case	277	165
0385-1	7.2V cdlss. drill w/case	174	105
0224-1	⅜" drill 4.5A magnum	189	114
0234-1	½" drill 4.5A mag 0-850 rpm	199	107
0244-1	½" drill 4.5A mag 0-600 rpm	199	107
0222-1	⅜" drill 3.5A 0-1000 rpm	174	99
0228-1	⅜" drill 3.5A 0-1000 rpm	164	95
0375-1	⅜" close quarter drill	208	119
0379-1	½" close quarter drill	243	149
6539-1	Cordless screwdriver 190 rpm	113	69
6540-1	Cdlss. screwdriver w/bits & cse	154	95
6546-1	Cdlss. screwdriver 200 & 400 rpm	120	75
3102-1	Plmbrs rt angle drill kit	330	189
3002-1	Electricians rt angle drill	320	199
5399	½" D-hdle ham drill kit	304	175
1676-1	H.D. Hole Hawg w/cs	415	224
6511	2 sp SawZall w/case	214	125
6405	8¼" circle saw	219	129
6750-1	Drywall gun 0-4000 4.5A	154	95
6507	TSC SawZall w/case	229	129
6170	14" chop saw	430	275
6012	Orbital sander 3⅝"x7⅜"	189	115
6014	Orbital sander 4½"x9¼"	199	118
6305	6¼" cordless circle saw	299	175
8977	Var. temp heat gun	114	75
5397-1	⅜" v. spd. hammer drill kit	232	139
5371-1	½" v. spd. hammer drill kit	318	185
3107-1	½" v. spd. rt angle drill kit	340	195
6754-1	Drywall gun 0-4000 4.5A	179	119
6747-1	Drywall driver-0-2500	154	99
0230-1	⅜" drill 0-1700 rpm	179	105
3300-1	½" v. spd. magnum rt angle kit	299	179
5660	Router 1½ H.P.—10 amp	299	189
5680	Router 2 H.P.—12 amp	350	225
5455	⅔" polisher 1750 rpm	209	129
6215	16" chain saw	280	169
8975	Heat gun	89	59
6365	7¼" circular saw	195	114
6366	7¼" circ saw w/fence & bld	204	119
6368	7¼" circ saw w/fence, bld & cse	233	129
0215-1	2 spd cordless drill Hi-torque	222	129
0235-1	½" drill keyless chuck mag	209	119
6016	¼ sheet pad sander	79	46
6145	4½" grinder 10,000 rpm	154	95
6142	6145 w/case & access.	192	115
6749-1	Drywall gun 0-2500 4.5A	169	125
6377	7¼" worm drive saw	295	174

FREUD SAW BLADES

⅝" Bore—Industrial Grade

CARBIDE TIPPED SAW BLADES

Item No.	Description	Diam.	Teeth	List	Sale
LU72M010	Gen. Purp. ATB	10"	40	58	39
LU61M010	Gen. Purp. TrCh	10"	40	65	42
LU82M010	Cut-off	10"	60	77	45
LU84M011	Combination	10"	50	65	38
LU85M010	Super Cut-off	10"	80	96	55
LM72M010	Ripping	10"	24	57	36
LU73M010	Cut off	10"	60	70	44
LU87M010	Thin kerf	10"	24	60	39
LU86M010	Thin kerf	10"	60	74	44
LU88M010	Ultimate	10"	80	107	69
LU89M010	Non-ferrous metal	10"	72	87	55
PS203	Gen'l Purp.	7¼"	24	25	19
PS303	Plywood	7¼"	40	36	25
SD306	6" Dado - Carbide			184	105
SD308	8" Dado - Carbide			196	109
F0	1⅜"x⅝" Biscuits 1000-Qty.			32	27
F10	2⅛"x⅜" Biscuits 1000-Qty.			32	27
F20	2⅛"x1" Biscuits 1000-Qty.			34	29
FA	Assorts Biscuits 1000-Qty.			34	29
WC106	6 pce. chisel set w/cse ⅛"-1"			73	52
WC110	10 pce. chisel set w/cse ⅛"-1½"			119	78
FB100	16 pce forstner bit set ¼"-2⅛"			264	155
FB107	7 pce. forstner bit set ¼"-1"			82	49
94-100	5 pce router bit door system			288	159
JS100	Biscuit Jointer w/case			300	159
CE32	Planer w/cse. carb blds. & guide			218	129
FT2000	3¼ H.P. plunge router			299	189

MAKITA CORDLESS

Model		List	Sale
6070DW	⅜" var. spd. rev. drill, 7.2v	130	78
6071DWK	⅜" var. spd. rev. drill w/removable batt. 7.2v	199	115
5090DW	3⅜" saw kit, 9.6v	256	139
6010DWK	⅜" cordless drill kit, 7.2v	164	95
6010SDW	⅜" cordless drill, 7.2v	99	65
DA3000DW	⅜" angle drill, 7.2v	251	139
8400DW	Hammer drill kit, 9.6v	272	149
4390DW	9.6 volt cdls. recip saw kit	230	128
4300DW	Jig saw kit comp., 9.6v	232	129
6012HDW	2 spd. driver drill w/clutch & case, 9.6v	236	117
6092DW	V/spd. drill, kit complete	250	123
6093DW	V/spd. drill w/clutch—complete	261	127
6891DW	Drywall gun 0-1400, 9.6v	237	135
632007-4	9.6 volt battery	48	30
632002-4	7.2 volt battery	40	28
5007NBA	7¼" saw w/elec. brake	233	128
5008NBA	8¼" saw w/elec. brake	284	158
BO4510	¼ sheet pad sander	85	54
9900B	3"x21" belt sander w/bag	268	148
9924DB	3"x24" belt sander w/bag	282	149
9045N	½ sht fin. sand. w/bag	231	134
4200N	4½" circ. saw 7.5 amp	225	127
4301BV	Orb. v/sp jig saw 3.5 amp	289	155
JR3000V	Vs. recip saw w/case	227	129
LS1020	New 10" miter saw	463	245
9820-2	Blade sharpener	373	209
1900BW	3¼" planer w/case	209	115
1911B	4⅜" planer 7.5 amp	240	139
1100	3¼" planer w/case	401	219
9207SPC	7" sander-polisher	276	155
3601B	1¾ H.P. router	255	139
3700B	½ H.P. trimmer	190	115
9501BZ	4" grinder, 3.5 amp	126	75
BO4530	6" round sander	101	59
BO4550	¼" sheet pad sander w/bag	86	55
DA3000R	⅜" angle drill	270	148
6302	⅜" v/spd. 5.2 amp drill	209	125
HP2010N	¾" v/sp hammer drill w/case	300	165
2708W	8¼" table saw	504	259
2711	10" table saw w/brake	841	489
2030N	12" planer/jointer	3120	1789
2040	15⅝" planer	2595	1489
1805B	6½" planer kit w/case	679	359
5005BA	5½" circular saw	223	135
6404	⅜" drill 0-2100 rpm, 2 amp	104	65
6510LVR	¾" drill rev. 0-1050 rpm	145	79
6013BR	½" drill rev. 6 amp	241	139
5402A	16" circular saw - 12 amp	636	349
3612BR	3 H.P. plunge router	377	195
9401	4"x24" belt sander w/bag	318	169
3620	1¼ H.P. plunge router w/case	192	109
4302C	V/spd. orb. jig saw	302	159
5077B	7¼" Hypoid saw	252	138
LS1440	14" Miter saw	721	435
2414	14" cut-off saw AC/DC	351	205
5007NB	7¼" circ saw 13 amp	209	114
3612B	3 HP plunge router sq/base	377	195

SENCO AIR NAILERS

Model		List	Sale
SFN1	Finishing nailer 1" - 2"	377	269
SFN2	Finishing nailer 1½" - 2½"	571	395
SN325	Nailer 1⅞" - 3¼"	665	445
M2	General purpose 1⅜" - 2"	475	345
SN4	General purpose 2" – 3½"	685	469
LS2	Pinner ⅝" - 1"	351	255
SK5	Stapler ⅝" - 1½"	351	249
LS5	Pinner, 1"-1½"	399	285

SKIL SIZZLERS

Model		List	Sale
6850-02	"NEW" ½" EMH hammer drill w/case 4 amp	255	129
5510	(551) 5½" circ saw	112	105
5625	(552) 6½" circ saw	175	129
5656	(553) 7¼" circ saw	132	125
5750	(807) 7¼" circ - drop foot	198	145
5790	(810) 10¼" circ - drop foot	400	275
5825	(367) 6½" worm saw	229	155
5865	(825) 8¼" worm saw	250	164
4580	Vari - orbit jig saw w/case	144	105
3810	10" Miter saw	263	225
3810S	3810 w/60 tooth carb. blde		239
7575	¼" palm sander	52	49
77	7¼" worm drive saw	230	145
5350	2½ HP circ. saw	80.99	77
5250	2¼ HP circ. saw	58.99	56
2735-04	12v v/spd. cordless drill complete w/case, & 2 batt.	210	144

LEIGH DOVETAIL JIGS

D1258-12—List 314.00—Sale 269.00
D1258-24—List 375.00—Sale 305.00
LEIGH INSTRUCTIONAL VIDEO—SALE 29.00!!

MMT 500	NEW 24" multiple mortise & tenon jig	509	399
MMT	12" multiple mort. & tenon attachment for D1258-12	269	219
MMT	24" multiple mort. & tenon attachment for D1258-24	299	239

HITACHI TOOLS

Model		List	Sale
TR8	Plunge router, 1½ H.P.	219	119
M12V	NEW 3 H.P. var/spd. router	437	249
TR12	Plunge router, 3 H.P.	354	175
C10FA	10" dlxe. mitre saw	490	275
C12FA	"NEW" 12" mitre saw	586	339
C8FB	8½" slide compound saw	859	469
FREUD	LU91M008 - 8½" c/bld 48 tooth	58	49
C15FB	15" miter saw	745	409
FREUD	LU85M015 - 15" c/bld 108 tooth	181	115

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34-444 Table Saw Complete w/1½ H.P. motor & stand 619.00

34-445—34-444 Table Saw complete w/30" Unifence 799.00

33-150 8¼" Saw Buck 485.00

28-283F 14" Band Saw w/enclosed stand & ¾ H.P. motor 699.00

70-200 NEW 20" Drill Press 709.00

17-900 15½" Floor Drill Press 385.00

40-601 18" Scroll Saw w/stand and blades 699.00

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PIRANHA By Black & Decker

CARBIDE TOOTH SAW BLADE

Model#	Diameter	#Teeth	List	Sale
73-716	6-1/2	18	13.70	7.35
73-756	6-1/2	36	30.45	16.85
73-717	7-1/4	18	13.90	7.99
73-737	7-1/4	24	17.20	9.29
73-757	7-1/4	40	31.30	16.79
73-758	8	40	43.80	24.85
73-759	8-1/4	40	44.65	24.99
73-719	8-1/4	22	19.65	10.95
73-739	9	30	32.35	16.79
73-769	9	60	68.35	35.99
73-715	5-1/2	16	13.70	7.49
73-704	7-1/4	18	20.20	12.85

THE SPECIAL BLACK AND DECKER PIRANHA BLADE PRICES ARE BACK!!!

Model#	Diameter	#Teeth	List	Sale
73-740	10	32	33.20	15.95
73-770	10	60	61.46	29.95
73-711	10	50	65.08	29.95

JORGENSEN STEEL I-BAR CLAMPS

Model	Size	List	Sale
7224	24"	27.11	17.55
7236	36"	29.10	18.65
7248	48"	31.96	19.75
7260	60"	35.60	23.55

ADJUSTABLE HANDSCREWS BY JORGENSEN

Item No.	Jaw Length	Open Cap	List	Sale	Box of 6
#3/0	6"	3"	15.57	8.89	49.98
#2/0	7"	3½"	16.74	9.95	53.55
#0	8"	4½"	18.63	11.95	62.95
#1	10"	6"	21.30	12.99	71.49
#2	12"	8½"	24.45	15.95	81.89
#3	14"	10"	31.01	18.95	104.55
#4	16"	12"	40.30	24.89	146.85

STYLE 37 2½" Throat ¼"x¾" JORGENSEN

Item No.	Jaw Length	List	Sale	Box of 6
3706	6"	9.30	6.29	35.65
3712	12"	10.30	6.79	38.59
3718	18"	11.37	7.35	41.69
3724	24"	12.42	7.99	45.25
3730	30"	13.85	9.05	51.19
3736	36"	15.15	9.95	56.65

PONY CLAMP FIXTURES

Model		List	Sale	Lots of 12
50	¾" black pipe clamps	13.10	7.89	83.99
52	½" black pipe clamps	10.93	6.30	68.25

PANASONIC CORDLESS DRILLS

Model		List	Sale
EY6205B	NEW w/spd. 12 volt drill w/15 minute charger	390	219
EY6200B	NEW 2 spd. 12 volt drill d-hdle w/15 minute charger	350	195
EY6281B	NEW v/spd. 9.6 volt drill w/15 minute charger	350	198
EY571B	V/spd. 9.6 volt drill	239	135

BOSCH

Model		List	Sale
1581VS	Top hdle. jig saw	239	129
1582VSC	NEW "CLIC" Barrell jig saw	245	135
1582VS	Barrell grip jig saw	225	129
Bosch metal case for above jig saws		34	30
Bosch blade assortment for jig saws 30 of Bosch's best selling blades		25.99	
1942	Heat gun 650°-900°	99	75
1272D	3"x24" belt sander w/bag	299	175
1273D	4"x24" belt sander w/bag	315	179
11-212VSR	Bulldog ¾" SDS rotary drill	339	195
1198VSR	½" v/spd hammer drill	229	135
1608	5.6 amp lam trimmer	140	89
1608L	Same as above w/trimguide	145	92
1609	5.6 amp offset base trimmer	205	122
1609K	Lam installers kit w/1609	295	169
1601	1 H.P. Router 25,500 rpm	165	105
1602	1½ H.P. Router 25,000 rpm	199	125
1603	1½ H.P. D handle router	223	137
1604	1¾ H.P. 2 hdle. router	219	119
1604K	Same as above w/case & access.	269	169
1606	1¾ H.P. D hdle. Router	243	142
3258	3¼" planer w/blade guard	210	129
3270D	3"x21" belt sander w/bag 5A	225	135
1273DVS	V/spd. 4x24 belt sander	339	189
1611	3 H.P. plunge router	349	195
1611EVS	3 H.P. Var/spd. router	410	234
1651	7¼ circ. saw drop foot	179	109
1854	7¼ circ. saw pivot base	179	109
1632VSRK	Recip. saw 8.4A orb. v/spd.	225	135
3050 VSRK	"NEW" 9.6V v/spd. cdls. drill w/case. & 2 batteries	235	135
3283DVS	"NEW" 5" Random orbit disc sander 2.3 amp	159	125

HEGNER SCROLL SAWS

Model	List	Sale
Multi Max II w/stand	699	625
Multi Max 14 var./spd. w/stand	799	695
Multi Max 18 var./spd. w/stand	999	819

BOSTITCH AIR NAILERS

Model		List	Sale
N80C-1	Utility coil nailer	795	395
N80S-1	Stick nailer	795	395
T36-50	Sheathing & decking stapler	595	334
N12B-1	Coil roofing nailer	795	395
N50FN-2	Finishing nailer	625	335
T31	Brad nailer	245	149

ELU BY BLACK & DECKER

Model	Description	List	Sale
3338	2¼ H.P. var/spd plunge router	387	255
3337	2¼ H.P. plunge router	356	238
3304	1 H.P. var/spd plunge router	261	178
3375	3¼" universal planer 7.2 amp	280	188
3380	Biscuit jointer/spliner w/case	485	325
4024	3x21" var/spd belt sander	289	195
3303	1 H.P. plunge router	210	159
4023	3x21" belt sander 5.2 amp	261	185
4029	4x24" belt sander 9.2 amp	459	319

BLACK & DECKER

Model		List	Sale
1166	⅜" drill 0-2500 rpm 4 amp	96	59
2600	⅜" drill 0-1200 rpm 4.5 amp	125	85
1707	8½" crosscut miter saw	813	449
1703	10" miter saw w/73-770 blade	313	179
3157	Orbital var/spd jig saw	203	125
3153	Variable speed jig saw	195	120
3047-09	7¼" super saw cat w/brake	282	168
3048-09	8¼" super saw cat w/brake	297	179

BIESEMEYER FENCES

	50" commercial saw fence	329	285
	52" homeshop saw fence	249	225

JET TOOLS

Model	Description	List	Sale
JBS-14MW	14" band saw, 1 H.P.	482	385
JTS-10	10" table saw w/stand, 1½ H.P.	554	459
JTS-12	12" table saw w/stand, 1½ H.P.	630	509
JWS-18	½" spindle shaper w/stand, 1 H.P.	479	375
JJ-4	4" jointer, ½ H.P.	310	285
JJ-5	6" jointer, ¾ H.P.	465	379
JWP12	12½" bench planer, 2 H.P.	569	359
JWP12D	Dust chute for JWP12	45	22
JSG-6	6" x 48" belt & 12" disc sander, 1½ H.P.	634	465
OR1458	14" bench drill press, ½ H.P.	279	259
OR1758	17" bench drill press, ½ H.P.	319	279
OR1458F	14" floor drill press, ¾ H.P.	369	325
OR1758F	17" floor drill press, ¾ H.P.	395	339
OR2501F	20½" floor drill press, 1 H.P.	655	519

RYOBI SPECIALS

Model	Description	List	Sale
R500	2¼ H.P. plunge router	326	155
TS25IU	10" miter saw	392	185
TS25IUS	10" miter w/acc. kit & B & D 73-770 carbide blade	435	225
AP10	10" surface planer 13 amp.	820	358
RA200	8¼" radial arm saw	515	249
RE600	3 H.P. plunge router	398	215
R150K	1 H.P. plunge router w/case	206	105
BE321	3"x21" v/spd. belt sander	259	135

PORTER CABLE

690	1½ H.P. router 8 amp	225	128
691	1½ H.P. router D hdle	245	137
536	1½ H.P. speedmatic router	310	195
518	3 H.P. 5 speed router	560	338
520	3 H.P. 15 amp router	510	315
695	1½ H.P. router/shaper	310	198
696	H.D. shaper table	170	119
351	3"x21" belt sander w/o bag	225	125
352	3"x21" belt sander w/bag	235	133
360	3"x24" belt sander w/bag	310	175
361	3"x24" belt sander w/o bag	290	169
362	4"x24" belt sander w/bag	325	185
363	4"x24" belt sander w/o bag	310	179
315-1	7¼" top hdle 13 amp circ saw	195	115
9315-1	315-1 comp. w/cse. & carb. bld.	225	129
617	7¼" pushhandle 13 amp	195	115
9617	617 comp. w/cse. & carb. bld.	225	129
314	4½" trim saw 4.5 amp	215	128
9548	X HD bayonet saw w/case	290	192
9629	Recip saw v/sp 8 amp	235	137
9627	Recip saw 2 speed 8 amp	225	128
556	⅝" H.D. vsp drill 0-1200 rpm	185	122
621	⅜" H.D. v spd. 0-1000 rpm	155	95
320	Abrasive plane 3 amp	160	109
9118	Porta plane 7 amp kit	335	185
7545	0-2500 drywall gun 5.2 A	169	104
7540	0-4000 5.2 amp gun	165	102
505	½ sheet pad sander	195	109
7511	⅜" v spd. drill 5.2 amp	185	112
7514	½" v spd. drill 0-750	195	119
537	1½ H.P. D hdle router	325	205
7548	Top hdl jig saw 4.8 amp	230	129
7648	Barrel grip jig saw 4.8 amp	225	139
330	Speed block sander ¼ sht	97	55
555	Plate biscuit jointer w/cse	299	165
345	6" saw boss 9 amp	170	99
9345	345 comp. w/cse. & carb. bld.	220	129
5060	"Stair Ease" stair templet	194	129
5061	"Stair Ease" hard wood	204	135
100	⅞ H.P. router	165	105
5008	Dovetail template kit	99.50	79
5009	Mortise & Tenon jig	54.95	49
5116	omni-jig	395	265
9647	TIGER CUB recipro saw	195	119
9850	12 volt cordless drill w/cse.	230	129
8500	Extra 12v battery	48	35
	NEW Tools By Porter Cable!		
9637	Full v/spd recip saw 8 amp	240	135
7538	3¼ H.P. plunge router	399	249
7399	5.6 amp drywall cutout unit	120	75
7310	5.6 amp lam trimmer	145	89
7312	5.6 amp offset base lam trimmer	209	119
7319	5.6 amp tilt base lam trimmer	165	105
97310	LAM TRIM KIT W/STD. BASE, TILT BASE, OFFSET BASE, SLITTER BASE, GUIDE & CSE	339	185
7334	5" random orbit sander	205	119
693	1½ H.P. plunge router	280	165
6931	Plunge router base	120	75

7334K Kit includes: 7334 Sander
44350 case, w/1 roll of 100X & 150X discs
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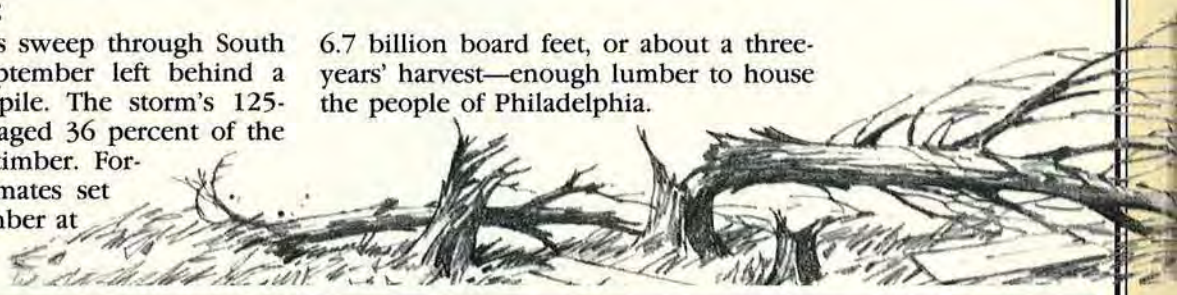
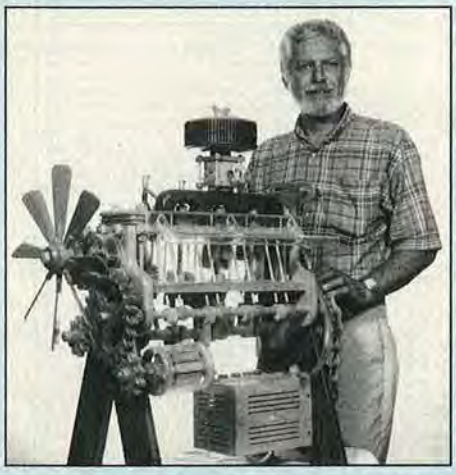
FINISHING TOUCHES

Print this article

Hugo's harvest

Hurricane Hugo's sweep through South Carolina last September left behind a staggering woodpile. The storm's 125-mph winds damaged 36 percent of the state's standing timber. Forest industry estimates set the destroyed timber at 6.7 billion board feet, or about a three-years' harvest—enough lumber to house the people of Philadelphia.





Paul Wilson and his handmade, hardwood, four-cylinder engine.

Detroit oak

It all started with some clear plastic tubing that reminded Paul Wilson of engine cylinders. By the time he was done, the 54-year-old high school shop teacher from Beaver Falls, Pennsylvania, had built an automobile engine out of wood.

Powered by a battery and an electric motor, the parts of Paul's creation move just like a real four-cylinder engine. The fan spins, the crankshaft rotates, and the four pistons slide up and down in plastic tubes. He relied on red oak for most of the engine, and some hard maple. In all, the wooden power plant boasts several hundred parts.

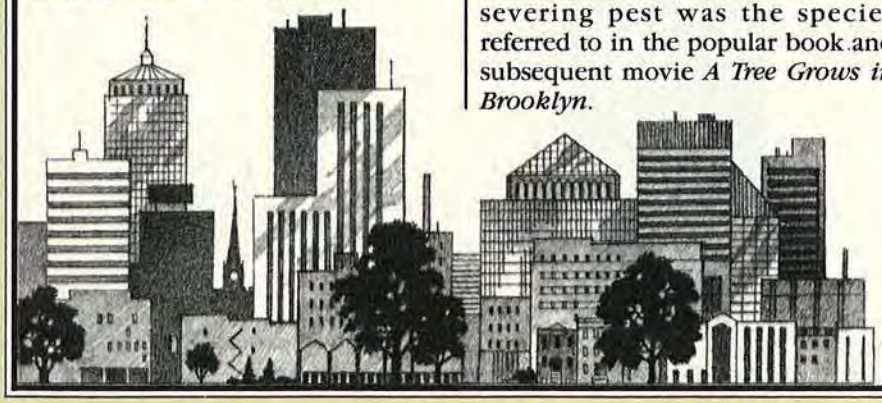
"They're fun to make, and to watch in operation," Paul says of the all-wood engine. "I'm sure I'll be building more of them sometime in the future."

In fact, for woodworkers with loads of patience and the same mechanical bent, he has put together a set of drawings, extensive instructions, and how-to tips covering all one needs to know to build a four-cylinder engine like his. For more information about his building plans, contact Paul at *Wilson Creations, 121 Pinebrook Drive, Beaver Falls, PA 15010. Telephone 412/843-3178.*

City chainsaw murders

The editors of *American Forests* magazine surveyed 20 cities from Boston to San Diego to find out what shape our urban forests are in. They found bad news.

On the average, four trees die or are removed for each new tree planted. In some, it's as high as 10 to one. Around Atlanta, for instance, about 50 acres of trees are converted to urban use *each day*. Chicago had the best ratio of healthy trees to tree spaces.

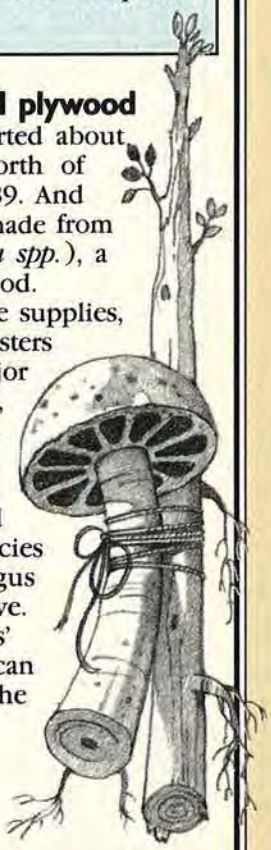


It grows in Brooklyn

The Tree of Heaven (*Ailanthus altissima*), a native of China, grows rapidly in poorer-than-average conditions. Brought here in the 1920s and 1930s to provide quick shade, the tree now proliferates east of the Rocky Mountains. In fact, it has become a weed tree, competing with more desirable native species. The wood looks somewhat like ash, yet because it doesn't compare in size, strength, or hardness, it goes unworked. Strangely enough, the persevering pest was the species referred to in the popular book and subsequent movie *A Tree Grows in Brooklyn*.

Of fungus and plywood

Indonesia exported about $2.5 billion worth of plywood in 1989. And most of it was made from meranti (*Shorea spp.*), a tropical hardwood. To ensure future supplies, Indonesian foresters set out on a major replanting. But, the seedlings wouldn't grow! Now, researchers have found out that the species requires a fungus on its roots to live. With the fungus' help, the land can again produce the tree.



Illustrations: Jim Stevenson

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The kind of work you use a router for is the kind of work you can't hide. Use a Ryobi Router and you won't want to.

Each of our fourteen different models, from our light-weight laminate Trimmer to our extra heavy-duty plunge routers, lets you put the finishing touches to your projects with confidence. Design features like clearly visible cutting bits and non-marring bases ensure results you'll be proud to display. And there's real power behind the delicate touch: high efficiency motors that deliver up to 3 HP.

Visit your professional power tool dealer for a first-hand look at Ryobi quality. Remember: when the work looks good, so do you.

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THE RIGHT TOOL FOR THE JOB.

Is a trouble-free polyurethane too much to ask?

With Scotchgard™ Wipe On Poly Finish from 3M, you get a smooth, beautiful, more protective polyurethane finish without bubbles and brushmarks.

Because with Scotchgard™ Wipe On Poly Finish, you don't even use a brush.

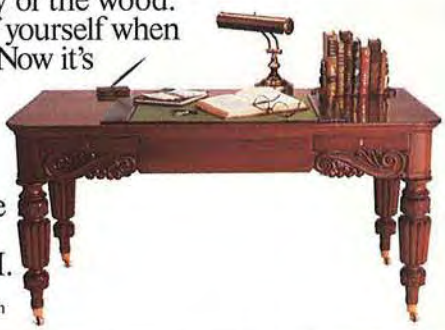
Go on. Try it. Just wipe it on. Scotchgard™ Wipe On Poly Finish actually penetrates the surface of the wood to provide protection that's harder and more resistant to spills and stains than brush-on polyurethanes.

©1990 3M

Apply it straight from the easy-to-handle bottle. Its clear formulation won't yellow your wood like other polyurethanes. Over bare wood or with stain,* it accents the beauty of the wood.

You ask a lot of yourself when you begin a project. Now it's time to ask more of your finish. Try Scotchgard™ Wipe On Poly Finish.

It's part of the wood refinishing system from 3M.



*Not for use with whitewash or paints.

3M